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# DIESEL

## PROGRESS

NOVEMBER, 1944 FIVE DOLLARS PER YEAR—FIFTY CENTS PER COPY



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DIESEL PROGRESS, for November, 1944. Volume X, Number 11. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 2 West Forty-fifth St., New York 19, N. Y. Rex. W. Wadman, President. Acceptance under the Act of June 5, 1943, at East Stroudsburg, Pa., authorized March 27, 1940. Subscription rates: \$5.00 per year, single copies 50c.



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**HEYWORTH CAMPBELL**

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**FRONT COVER ILLUSTRATION:** View on Guy Lovelace's turkey ranch near Dinuba, California, where the Caterpillar Diesel, "kitten," shown, works 240 acres producing green feed and grain for 16,000 turkeys. Fuel for the tractor costs 14c per hour.

**TABLE OF CONTENTS ILLUSTRATION:** A thoroughly camouflaged LCI landing vessel powered by a series of eight 6-cylinder, (two quads) General Motors Diesels manufactured by the Detroit Diesel Engine Division.

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*Engine and boat builders' officials smile their satisfaction on trial run.*

## Twelve New Army Diesel Harbor Tugs

By CHARLES F. A. MANN

**C**LARK Diesels join the Waterfront Parade. Long established in various branches of the industrial field, Clark Bros. moved 3500 miles to the Pacific Coast last summer and planted 12 of their husky 2-cycle Diesels in twelve little welded steel U. S. Army Transportation Corps. harbor tugs for another "First" for the Pacific Coast. The very "First" Clark Diesel to go into Pacific Coast marine service at once honored both the engine builders and the builders of the hull, Birchfield Boiler and Shipbuilding Inc. of Tacoma, one of the 11 builders of smaller wood and steel, Diesel special types of ships.

First of six all-electric welded steel Army harbor tugs was the *ST 680*, built at Birchfields, commissioned in mid-September, to be followed soon by six more from the A. E. Long yard at Olympia, Wash., down the Sound 32 miles from the Birchfield plant.

Riding low in the water like conventional harbor tugs always do, these ships are characterized by their relatively large power plants in proportion to their size and rather large, though somewhat cramped crews quarters for a total of 13 men, including the skipper. The design was originally perfected by Levingston Shipyard on the Gulf, and all details of design revision and supervision for the Birchfield section of the contract were handled by Mr. Cy Nelson of the Birchfield staff. Mr. Davies, president of the company, can turn out these mass-production all-electric welded steel hulls so fast that Mr. Nelson has a tough time keeping the machinery installation and outfitting schedule up to pace.

The Clark Marine Diesel is characterized by its simple, rugged design and compactness. It is of the 2 cycle type, with 12½ in. bore and 16 in. stroke, and has dual inlet-scavenging valves on each cylinder to permit high scavenging rate before the piston starts the upward stroke. The scavenging blower is built-in, double acting, single cylinder design, built on the outer end of the crankshaft, opposite the flywheel end. The Birchfield tugs carry a 6 cylinder main Diesel developing 650 hp. at 340 rpm. Built-in Timken thrust bearing; Bendix-Scintilla fuel injection; and a direct drive fresh water circulating pump, a built-in heat exchanger and a built-in salt water circulating pump and a built-in air compressor are features of this simple, rugged design. The result is an engine room not cluttered up with miscellaneous pumps and motors.

Weston tachometer and Alnor pyrometers are fitted. A York heating boiler and Honan Crane lube oil purifier are provided, as well as a 3 cylinder Quincy air compressor. Two McCord lubricators are fitted and a large capacity 26 cell Edison battery set is installed to handle the electric load.

Twin 6 cylinder Chrysler auxiliary Diesel sets are provided, driving 30 kw. Bardco generators. An Ingersoll Rand 2-cylinder motor driven compressor is also fitted. The main engine exhaust is handled by a Burgess snubber mounted in the stack, and a Cole deadfront switchboard handles the electric system throughout the ship.

The elaborate though somewhat crowded crews

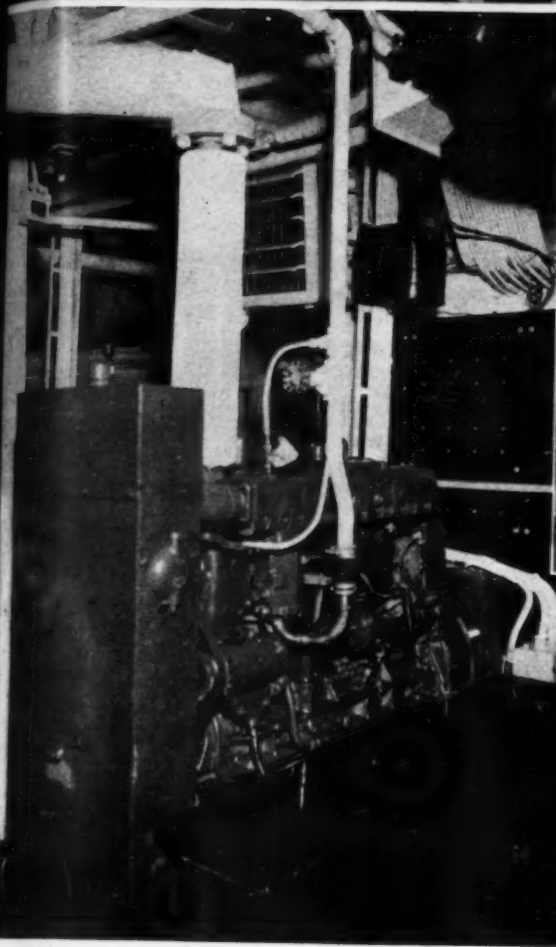
quarters consist of two double staterooms forward and 2 double staterooms aft of the engine grating, together with a compact galley across the width of the ship. The usual built-in cold storage box and oil fired range and tiled sink are provided.

The pilot house contains a Liquidometer rudder angle indicator; Bludworth direction finder and Weston repeating tachometer. A Northern Radio two-way telephone set is fitted for operations in remote small harbors should Army requirements demand. Aft of this space is a captain's room and 2 double staterooms for more crew. Each group of staterooms contains its own toilet facilities. A Link-Belt anchor windlass and Link-Belt towing winch, both for use with steel cable, are fitted, each motor driving through reduction gearing built into the drum housing.

These little tugs are only 85 x 23 x 11 ft. draft forward and 13 ft. aft, and have Doran propellers made in Seattle and a plain steel rudder. They are compact and neat in appearance all the way through, and are a novelty in this size of steel construction for use in the Pacific, traditional home of the wooden tug. Almost their entire interior is of fireproof steel construction but portable CO2 sets are provided throughout the ship.

A. E. Doyle, Clark Bros. factory guarantee engineer is in charge of installation of all 12 of these Diesel jobs and divides his time between Birchfield and the Long shipyards until the last of them are given their official okay by the Army Transportation Corps at Seattle.

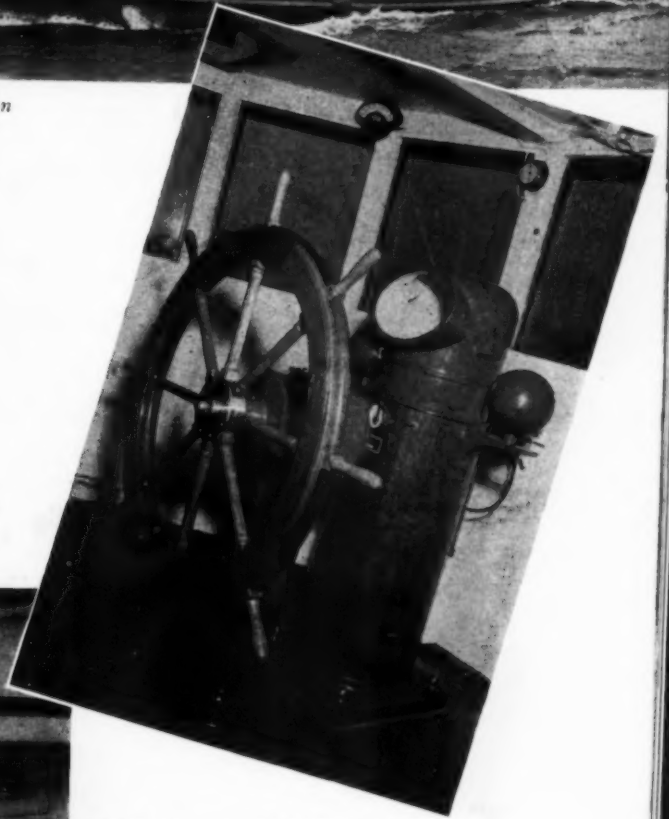




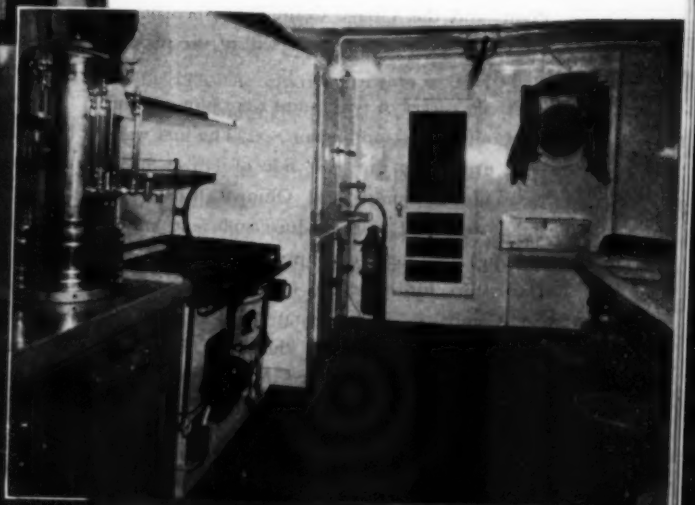
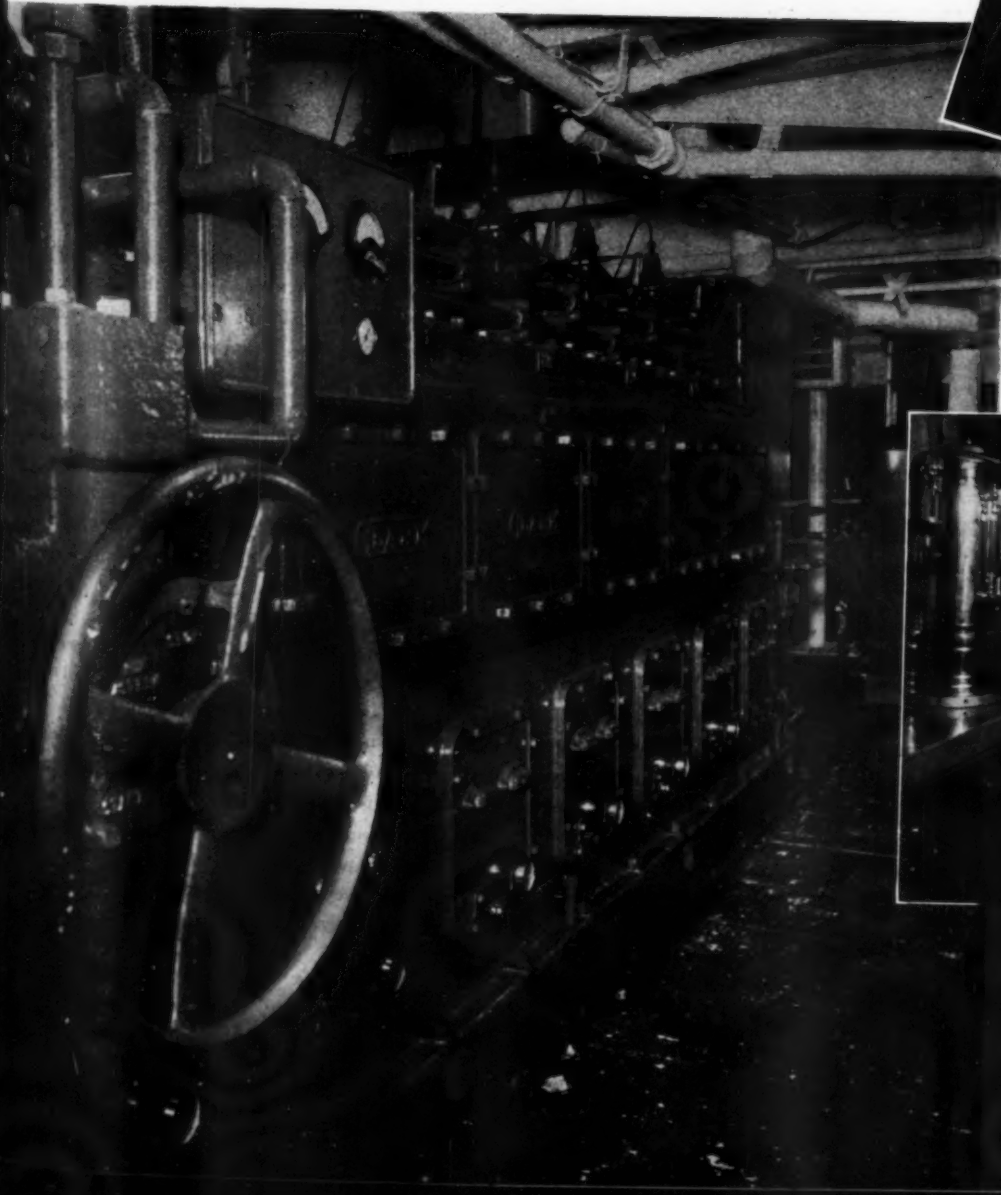
One of the two Chrysler Diesel auxiliary generating sets installed on each of the twelve tugs.



The Army Diesel tug ST 680 on trial run in Puget Sound.

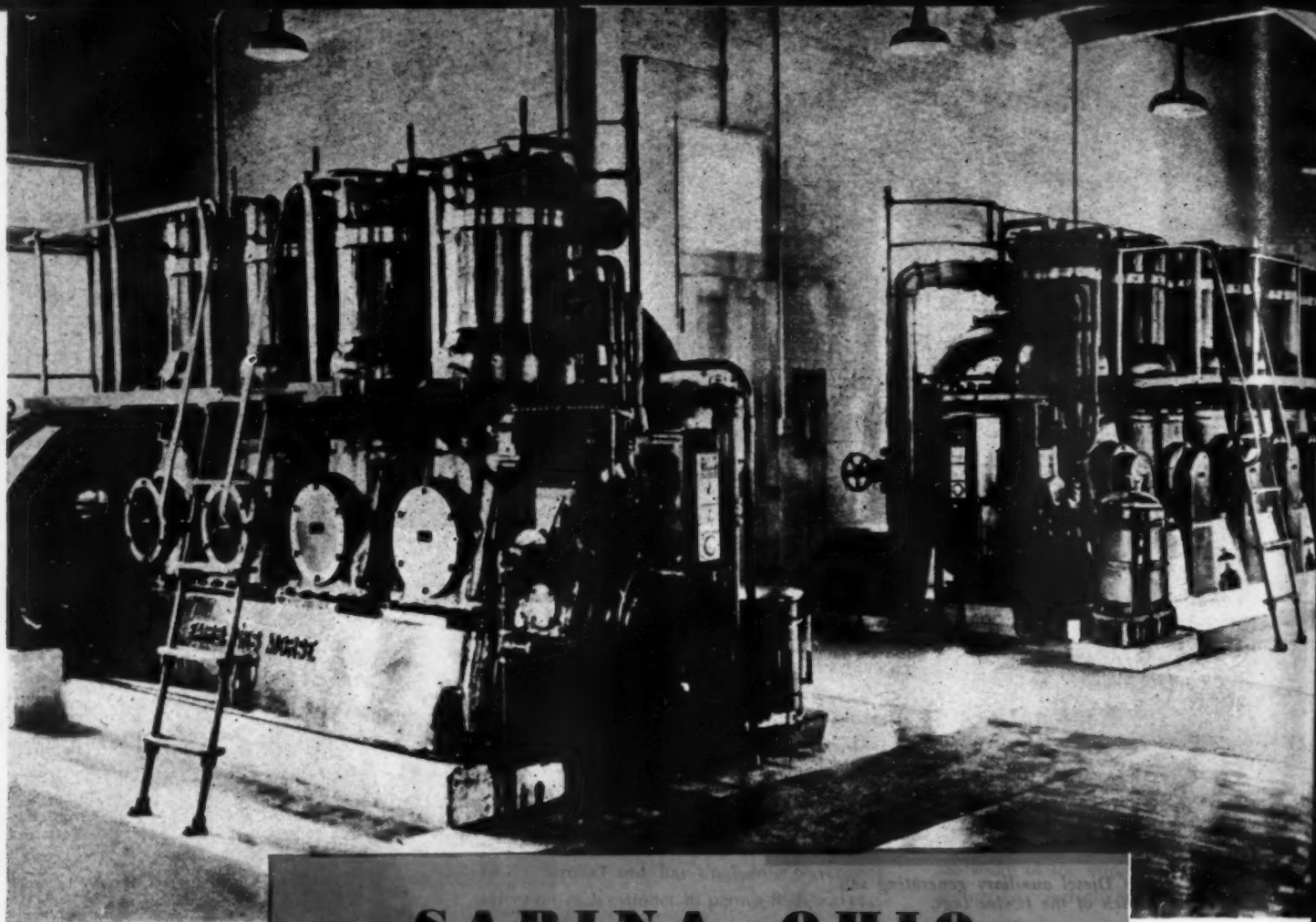


The binnacle and Montgomery Elevator hand steering gear in the pilot house. Note Weston tachometer above the wheel.



View of the galley. Sink, stove, and break-out unit.

View of the engine room. The large diesel engine is the main power source. The auxiliary generating sets are also visible.



## SABINA, OHIO

1897

**T**HE ballot stood 318-for and 56-against. Sabina, Ohio, had voted in its 1897 election to promote a bond issue of \$30,000 for the purpose of securing real estate and constructing a Municipal Electric Light and Water Works Plant, and the Village Council at once began the work of carrying out the will of the people.

Thirteen pieces of real estate were offered, and the Council took options on six. The first wells were drilled on the west side of Hulse Street near the Baltimore and Ohio Railroad. As these wells did not produce sufficient water, drilling was next attempted on the O. M. Darbyshire lots near the Clinton Manufacturing Company. Records state that supply was good at this point, but the State Board of Health would not approve the location of the wells. Tests were then drilled at an approved location on the property of Martin Kennedy, and when water proved ample, the Council bought three acres of this land for \$825.00. Mr. Kennedy donated the fifty-by-one-hundred-fifty-

foot lot on which the standpipe is located.

Construction bids were plentiful, and the minutes of the Council show forenoon, afternoon and night sessions for three consecutive days, meeting as early as seven in the morning and lasting until eleven-thirty at night. There was much difference of opinion regarding the type and speed of steam engine to be bought, and a number of resolutions to purchase engines were lost on a yea and nay vote. It was finally decided to buy a Russell medium speed engine at a price of \$1690.00.

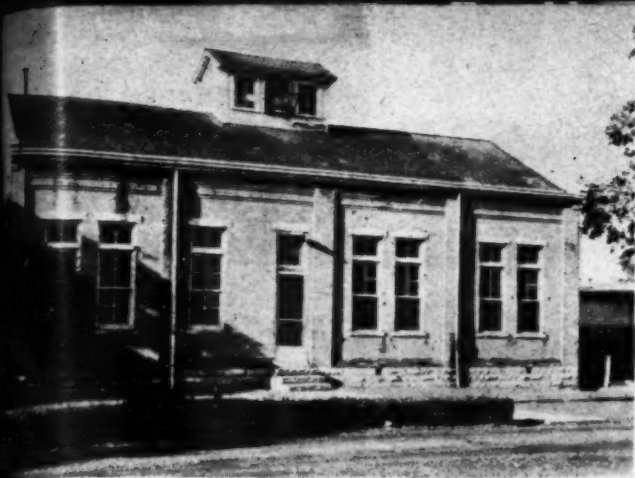
Progress of construction was delayed to some extent by one mandamus suit and one injunction suit against the town, but on the whole the plant was completed in a very reasonable length of time. Operation was occasional through July and August of 1898, and the Council fixed September first as the date when the town would begin charging for electric lights. No meters were used at this time. The

rate established was 60c per month for each 32cp lamp when less than three were used. Three or more lamps would cost 45c each per month.

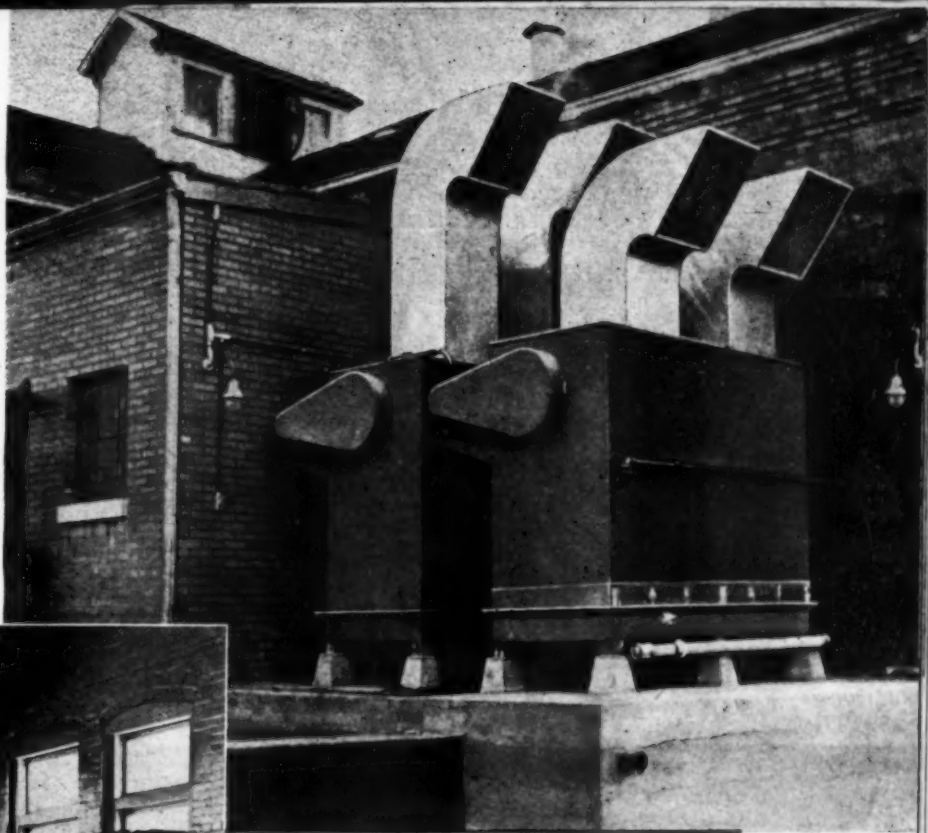
At first the plant operated only until midnight, but after one month, the Council ordered that current be furnished throughout the hours of darkness. Eli Pearson, the first engineer to operate the plant, was a deeply religious man, and it is said that he always offered prayer before starting the engine.

Original plans called for thirty-four street lights, but the Council ordered six additional lamps installed to bring the total to forty. Dr. F. G. Lightner was appointed a committee to sell the old gasoline street lamps for \$3.00 each, though there is no record of how many were sold or who bought them. Poles in the business section of town were wrapped with wire to a point six feet above the ground to prevent deterioration in their secondary function as hitching posts.





Above: The Sabina, Ohio, electric light and water works plant dates back to 1898. Left: Foreground, first F-M Diesel at Sabina, and right, a more recent F-M unit. Note Woodward governors and Honan-Crane lube reclaimers.



A pair of Fairbanks-Morse evaporative coolers, each rated 450 hp. One cooler can handle cooling of the three Diesels under normal load.

Left: The plant switchboard and the smaller of two F-M Diesels installed in 1940, a 2-cylinder, 150 hp. unit.

Few changes of equipment were made during the plant's first twenty years of operation, though the original 50kw generator was replaced in 1904 by a 100kw generator, and in 1909 the arc light machine was rewound and shortly thereafter replaced by a series incandescent system. The first real advancement came in 1917 when a second generator was added and the system changed from single-phase 133-cycle to three-phase 60-cycle. By this time the Russell engine was badly worn and too small for the load. A 200 hp. Skinner steam engine was installed, and on January 1, 1922, the plant began operating on a night and day basis.

Marked next for replacement were the 24-year-old boilers. This was done, and with a newly doubled boiler capacity and higher steam pressure, the Skinner unit ran night and day for the next four years with the old Russell engine

standing by for emergency needs. In 1926 an Ames steam engine of 200 hp. was added, and the doubled plant output proved ample for the ten years to follow.

In 1927, manual voltage regulation was changed to automatic, and a few years later the old wooden switch board gave way to a modern five panel board which included among its conveniences a frequency meter—for the benefit of those customers who owned the new electric clocks.

In 1937 Sabina took the big plunge, authorized the second bond issue in the history of the plant, and the purchase of a 300 horsepower Fairbanks-Morse Diesel with generator and all auxiliary equipment. The Diesel went into immediate and continuous operation, the two remaining steam engines were relegated to

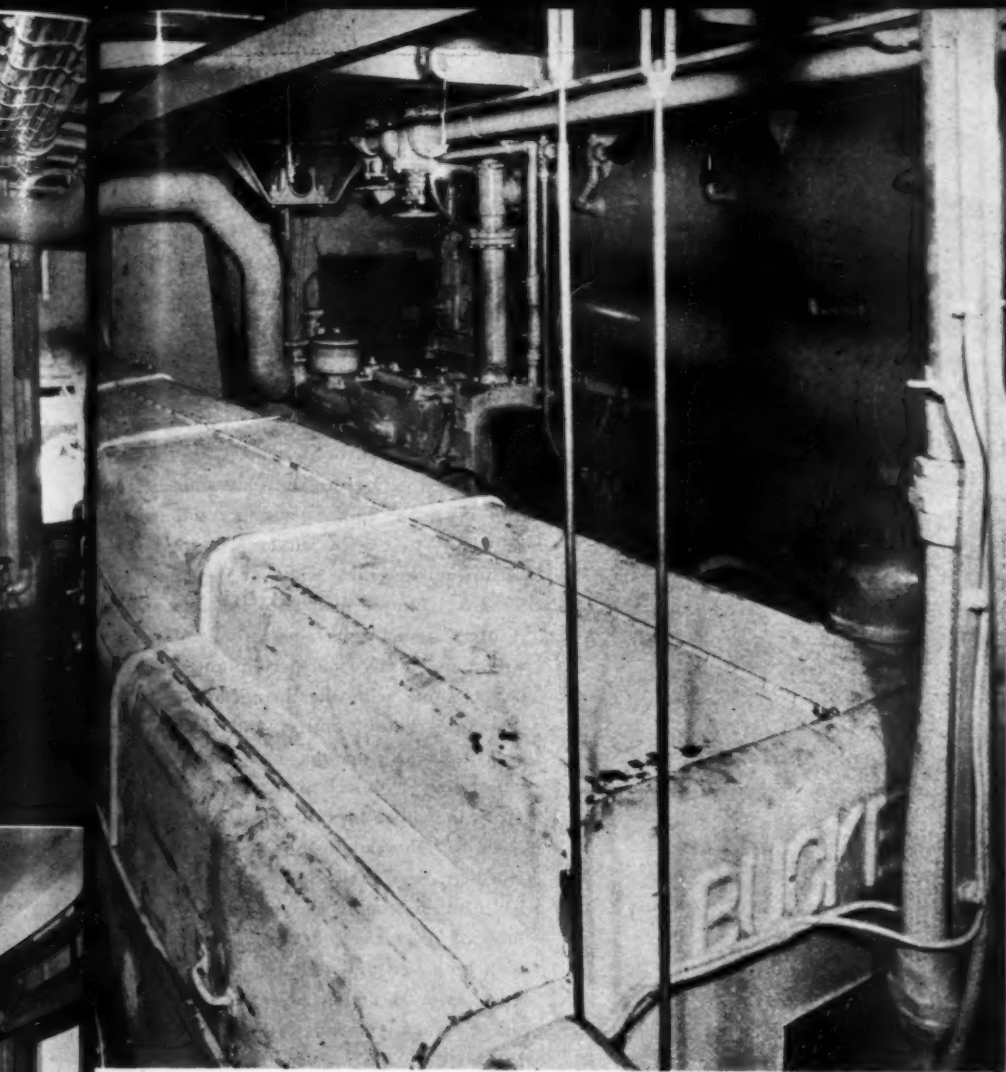
stand-by duty, and fuel costs dropped at once by a matter of about fifty per cent.

The Russell engine was sacrificed in this change, and by 1939 the rapid expansion of the Tool Factory and Plating works had absorbed all the surplus power provided by the new Diesel, and it was decided to retire the Skinner and Ames steam engines and go all out for Diesels. Fairbanks-Morse units of 150 hp. and 450 hp. were installed to bring plant capacity to a total of 900 hp., and this has afforded a very safe reserve of about fifty per cent over all demands.

Records for 1943 show a total of about a million kilowatt hours sold through the meters of the plant's 610 customers. Gross revenue totalled \$35,885.94, and a total operating cost for the year of \$19,285.67 which leaves a net operating profit of \$16,600.27.







Dominating the center of this engine room view is the main Buckeye Diesel, the first Buckeye Marine installation on the West Coast. Seen left is the 6-cylinder Buda-Lanova auxiliary generating set, and right, the Caterpillar Diesel auxiliary power unit.

American Diesel engine industry. If the boys who build and the boys who operate up in that country can't make it work, nobody else can so forget it!

This month the spotlight is on the Buckeye Diesel engine, which steps from its land-status into the purse seiner business, via the first West Coast marine installation ever made by Buckeye.

Honors go to the Messrs. Jaangaard of Seattle, noted fishermen, and their husky new "Postwar Type" purse seiner *North American*, completed Tacoma, by the two famous partners, A. Strom in September at Tacoma Boatbuilding Co., and H. Dahl, who began as successful fishermen themselves and wound up with four Navy E awards for completing large Navy minesweeper contracts before, during and at the end of successful building of some 50 large and lucky fishing vessels.

Buckeye sent none other than its Mr. Robert L. Nieswander, Sales Manager of Buckeye Diesels and Mr. J. O. Everett, Chief Engineer,

to the Coast to supervise the Premier of Buckeye in the West Coast Marine-Fishing field.

We went on a 24-hour shakedown cruise with the Buckeye turning all the tough antics required of a Navy-Spec. shakedown cruise, and the Buckeye came through with a vibrationless, fast and very cool performance that was really remarkable for an engine long of the land-bound variety and used to solid Good Earth for a foundation and plenty of city water for cooling. As this is being written, the *North American* arrived in Monterey for its first date with the fish on a moonless week-end.

The *North American* is heavily built of Douglas Fir, 87 x 23 x 11 ft. overall dimensions, which put her well in the "Giant Type" of seiner class. Every mechanical refinement is compactly spaced in the large engine room, far forward in the beamy hull and unusual flexibility has been obtained by the novel use of not only one Diesel auxiliary but two separate makes of different size Diesels. One is a 6 cylinder Buda Diesel driving a 25 kw. Clark

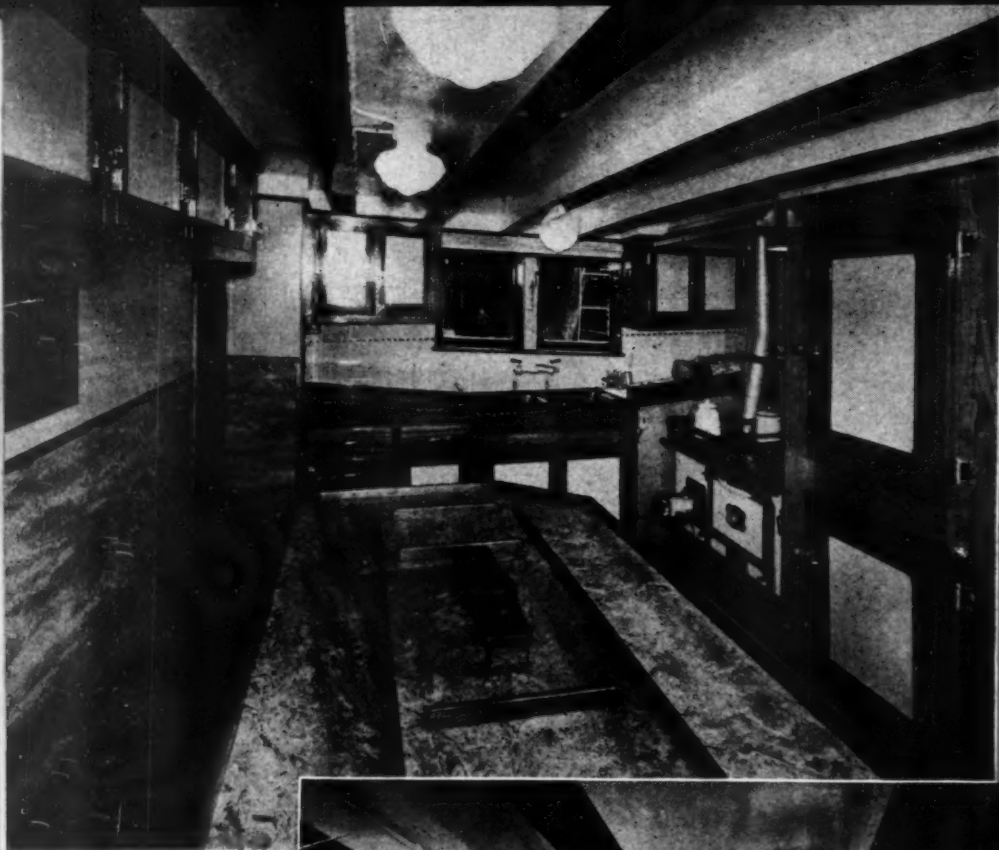
generator, complete as an independent unit, with American-Bosch fuel injection, De Luxe oil filters, Bosch fuel oil filter, 3 peewee size Purolators and an independent small Willard battery set for starting. The second auxiliary is a complete unit, consisting of a 90 hp. 6 cylinder Caterpillar Diesel, mounted on an elaborate, compact frame, complete with clutches and chain drive to the Bilge pump below and chain drive and clutch to the line-shaft that drives the Purse winch and windlass on the after deck. It also has a 15 kw. auxiliary generator, driven by 6 V belts; a Willard Battery-Leece Neville starter set and a Twin Disc clutch to drive the 2 cylinder Quincy auxiliary air compressor.

These auxiliary units are mounted beside the big Buckeye Diesel, in such compact fashion as to leave room for two 36 in. x 84 in. welded steel air bottles and 1 large ammonia storage tank for the ice machines. The 4 x 5 inch Fairbanks Morse pump, chain driven off the Caterpillar unit and a 4 x 5 in. F.M. circulating pump is separately driven by a 10 hp. F.M. motor. There are two 2½ x 2½ in. motor driven (1½ hp.) brine pumps for freezing fish in the twin large holds mounted just forward of the main 200-ton fish hold. This is a unique feature and permits compact handling of bait in case she fishes tuna, and provides storage on the return. A two-cylinder motor driven Quincy air compressor is also fitted, to operate off the large main Willard Battery set when the auxiliary Caterpillar unit is shut down.

The *North American* has three completely independent Willard Storage battery sets, to provide ample "juice" for every phase of the ship's operation and minimum operation of either auxiliary set during night rest periods and when underway on a long trip to or from its base port. The main Buckeye Diesel unit has a nifty little V belt drive on a 5 kw. Marine Electric, 120 volt auxiliary generator to keep the big Willard set on full charge basis at all times. A shutdown of the propulsion plant quickly shifts the charging load to the big 25 or the small 15 kw. set, with but one throw of the switch on the electric control panel.

A Trumbull electric switchboard installation is provided on the starboard side of the main engine space. Alaska Copper heat exchangers are provided on both auxiliary sets to permit straight fresh water cooling. Cutler Hammer Motor controls are also fitted throughout.

The Buckeye main Diesel is of the 8 cylinder trunk piston design, with 10½ in. bore and 12



The luxurious galley includes a large built-in cold storage locker, oil fired galley range, stainless steel double sink, Linowall with mahogany and white enamel trim.



Captain's stateroom and chartroom equipped with two-way radio.

in. stroke and has self contained Ross heat exchanger built into the base, together with 2 Goulds fresh and salt water circulating pumps. A Roper reversing lube oil pump and a Tut-hill fuel transfer pump; a built-in Timken thrust bearing, plus the usual Alnor pyrometer installation on both the engine room control spot and in the pilot house. Ditto for the Weston tachometer installation. Bendix-Scintilla fuel injection system is employed. The main Diesel lube system is fitted with a Wix-Bode filter which is mounted under the engine room deck to conserve space in the engine room and the filter connections are arranged

for by-pass or shunt operation. Oil is passed through the filter continuously, under pressure and at the highest available temperature without affecting the engine oil header pressure. The Wix-Bode filter uses a throw-away type element employing a mixture of cotton threads and vegetable fiber.

On the trial run cooling water outlet held steady at 122 degrees, and 44 lb. lube oil pressure. Exhaust temperature held steady at 670 degrees while the engine turned up 570 rpm. The engine is rated at 480 hp. at 600 rpm. Crew's quarters for 11 are fitted on the main

deck ahead of the galley. The large galley contains built-in frozen storage, Lang-Deluxe oil range, stainless steel and tile sink and is beautifully finished in mahogany and white enamel and Linowall covering that is easily cleaned—the nearest thing to a permanent wall finish that can be installed on a ship.

Maxim exhaust silencers are fitted in the squat, streamlined stack aft of the pilot house and large captain's office and stateroom, combined in a beautiful space with windows on three sides, occupying the entire width of the upper deck. This is a unique feature of the ship and was insisted upon by partners Strom & Dahl, who will retain a large partnership interest in this vessel, along with the Jaangaards of Seattle. The pilot house controls and steering wheel are duplicated on the upper forward deck, which has a novel shatterproof windscreen across the entire forward edge. The chart room section of the captain's office contains a 2-way Northern Radio telephone and the pilot house has a unique engine room alarm system for low lube oil pressure and hot engine indication, with both bell and visual indication that will rouse both the pilot and the captain as he sleeps on a night run. No engine failures on this boat!

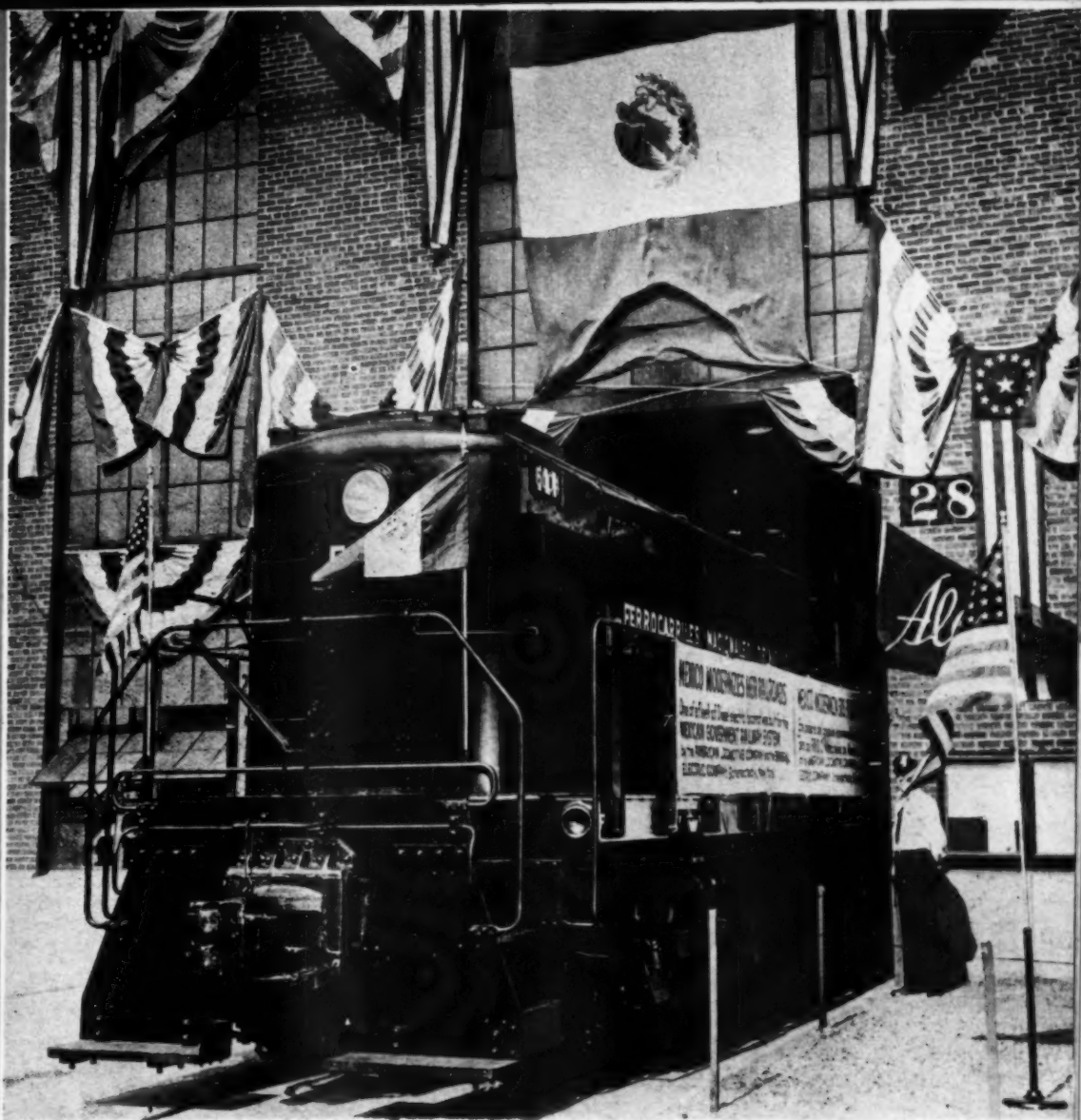
Refrigeration is provided by two Baker ice machines driven by 10 hp. Marine Electric motors and the compact compressors are 4 cylinder  $3\frac{1}{2}$  x  $3\frac{1}{2}$  in. units operating at high speed and require almost no space. McDonald fresh and salt water sanitary pumps are fitted also. A 3-speed double anchor windlass is fitted, with  $7\frac{1}{2}$  hp. motors and below-deck drive. This also has a self-contained Gypsy.

On the trial trip were the following prominent people connected with the builders, engine manufacture and "The Public"—consisting of your correspondent representing DIESEL PROGRESS; Mr. Arne Strom and Mr. Haldor Dahl, the co-partners of Tacoma Boatbuilding Co.; Ed Broz, Asst. Manager of Tacoma Boat; Robt. L. Neiswander of Lima, Ohio, Sales Manager of Buckeye Machine Co.; M. L. Claibough of Wix Accessories Corp.; Fred Smith, Storekeeper of Tacoma Boat; J. O. Everett of Lima, Ohio, Chief Engineer of Buckeye, Lars Jangaard, captain of the *North American*; Charles Bevis, Machinery Supervisor of Tacoma Boat and Hugh McCreadie, Pipefitting Supt. of Tacoma Boat, not to mention the best cook in the business—Fred Smith, Storekeeper, pinch hitting as Chef on the Shakedown cruise, and a vocation that has made him famous on Puget Sound trial trips.



# DIESELS ACROSS THE RIO GRANDE

By WILBUR W. YOUNG



The Alco-G.E. Diesel-electric 1000 hp. locomotive starts its long trek to Mexico as it emerges from the American Locomotive Diesel shop at Schenectady.

SCHENECTADY, New York, September 20. History, in the midst of war but with a peace-time overtone, was made here today when the American Locomotive and General Electric Companies joined in celebrating the christening and delivery of a unit of the fleet of Alco-G.E. Diesel-electric, 1000 hp. locomotives for the Mexican Government Railway System. High ranking Mexican Government, railway and business officials were present as guests of the joint builders who provided royally for their instruction and entertainment. Senor Don Vicente Sanchez-Gavito, Counselor of the Mexican Embassy, Washington, D. C., using the English language to perfection, paid high tribute to American industry which has so ably supplied the needs of not only our own huge fighting forces and those of the United Nations and liberated countries as well but at the same time has been able to produce for peace-time needs. Senor Gavito pointed to this fleet of Diesel-electric locomotives, the first to enter Mexican Railway service, as symbolic of the rising tide of friendship and cooperation between the two

neighbor nations. He also pointed to the increasing opportunities for American enterprise through Mexico's modernization program which embraces her industrial and railroad systems.

The present rehabilitation program for the Mexican Government Railroad involves an eventual expenditure of \$54,000,000. Last year more than \$4,000,000 was spent to hastily improve facilities for the rapid movement of war supplies between Mexico, the United States and Central America. The fleet of Diesel-electric locomotives is a considered part of this program and at the time this appears in print will be in active service on the Mexican lines.

The Mexican Government Railway system operates 8300 miles of track, serving 22 of the 28 states representing 76% of the area of the country including the major industrial, mining, commercial and agricultural centers of the Republic. With the advent of war Mexico became one of the major alternate sources of many essential elements including antimony, lead,

molybdenum, mercury, zinc, graphite, copper, tin, tungsten, manganese and many others. The burden of moving these supplies to American industries fell squarely on the railroads, since the customary sea routes were suddenly cut off by submarine warfare. In addition, the railroads were faced with an immediate and heavy increase in passenger traffic due to troop movements. In fact, freight shipments alone over the Mexican Government Railway System have increased more than 400% since Pearl Harbor. The rehabilitation program and the effectiveness and speed with which it has been pushed is credited with placing the rail system in position to handle this unprecedented burden.

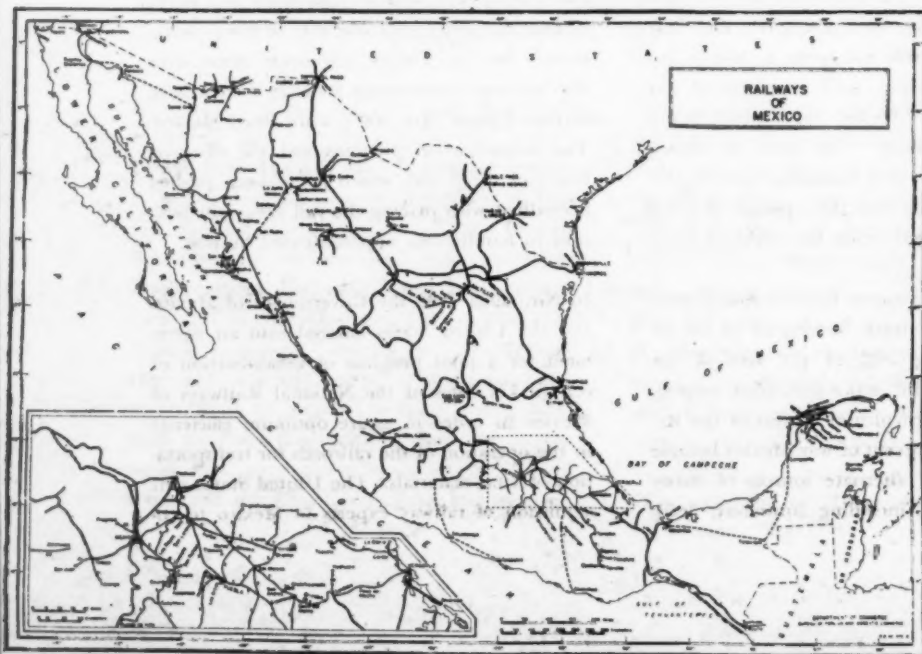
In November 1942 the Government of Mexico and the United States entered into an agreement for a joint program of rehabilitation of certain key lines of the National Railways of Mexico in order to assure optimum efficiency in the operation of the railroads for transportation of vital materials. The United States sent a mission of railway experts to Mexico to co-



Speakers' table at the luncheon. Left to right: Mr. K. Boynton, President General Electric, S. A. Mexico; Senor Don Vicente Sanchez-Gavito, Counselor of the Mexican Embassy, Washington, D. C.; Mr. W. L. Lentz, Manager of the Schenectady plant of American Locomotive Company; Mr. W. C. Dickerman, Chairman of the Board, American Locomotive Company; Mr. W. V. B. Van Dyck, Assistant to the President, International General Electric Company, Schenectady; Mr. D. W. Fraser, President of the American Locomotive Company, and Mayor Mills Ten Eyck of Schenectady.



High ranking Mexican government, railway business officials witness the christening of the Alco-G.E. Diesel-electric locomotive, one of a fleet delivered to the Mexican Railways. Niki Van Forstmeyer, 9, is the sponsor.





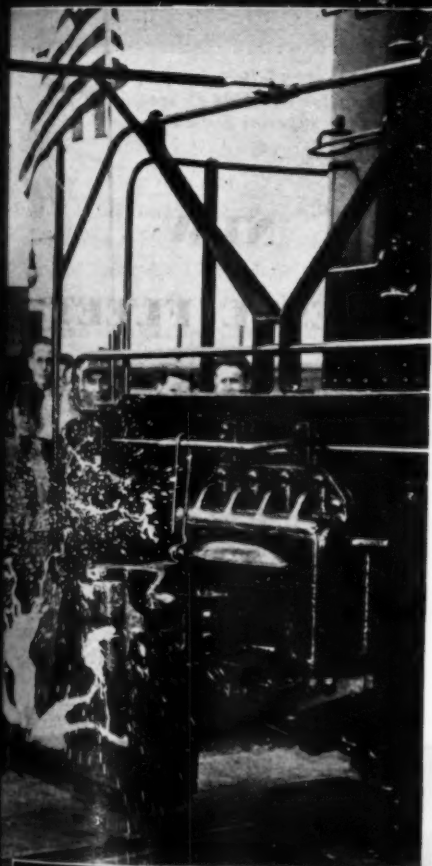


## MEXICO MODERNIZES HER RAILROADS

One of a fleet of Diesel-electric locomotives built for the MEXICAN GOVERNMENT RAILWAY SYSTEM.  
by the AMERICAN LOCOMOTIVE COMPANY and the GENERAL ELECTRIC COMPANY, Schenectady, New York

## MEXICO MODERNIZA SUS FERROCARRILES

Esta unidad es del grupo de locomotoras Diesel construida para los F.F.C.C. Nacionales de Mexico.  
por la AMERICAN LOCOMOTIVE COMPANY y la GENERAL ELECTRIC COMPANY, Schenectady, New York



Speakers and honored guests at the dedication ceremony aboard the Alco-G.E. Diesel-electric locomotive 5004 following the dedication. Left to right: Senior Ingeniero Adolfo Frias Beltran, General Purchasing Agent, Mexican Government Railway System; Senor Don V. H. Moscosso, General Agent, Mexican Government Railway System; Senor Don Jesus Gutierrez, Fiscal Agent, Government of Mexico; Mr. W. C. Dickerman, chairman of the board, American Locomotive Company; Mr. D. W. Fraser, president, American Locomotive Company; Senor Don Vicente Sanchez-Gavito, Counselor of the Mexican Embassy; Mayor Mills Ten Eyck, Schenectady; Mr. W. V. B. Van Dyck, Assistant to the President, International General Electric Company; Senor Don Gabriel Cordova, Secretary, Mexican Chamber of Commerce; Mr. K. K. Boynton, President, General Electric, S. A. Mexico and Senor Don Rafael Nieto, Consul, Mexican Government.

operate in the work and agreed to share the cost of necessary equipment and materials purchased in the United States and of rails and spikes produced in Mexico. The agreement was further extended to provide the services of American technicians and to repair locomotives and rolling stock in the United States.

The United States Ambassador to Mexico, Messersmith, said in 1943: "To rehabilitate the railways of Mexico is to contribute to the triumph of the United Nations and to prepare the economic defense of the country in the postwar era. And at the same time nothing could be more useful to my country than the shipment of Mexico's raw materials by railroad." The railroad is now preparing for what it expects will be a new period of prosperity based in part on the overflow of business from the Panama Canal.

The fleet of 1000 hp. and 660 hp. Alco-G.E. Diesel-electric locomotives are the first Diesel units to operate on the Mexican system and they are the first locomotives acquired under the rehabilitation program. All of them are now at work in key rail centers, speeding the make-up and movement of trains.

Left to right: Senor Don Vicente Sanchez-Gavito, Counselor of the Mexican Embassy; W. C. Dickerman, Chairman of the Board, American Locomotive Company; E. O. Shreve, Vice President, General Electric Company and Senior Ingeniero Adolfo Frias Beltran, General Purchasing Agent, Mexican Government Railway.





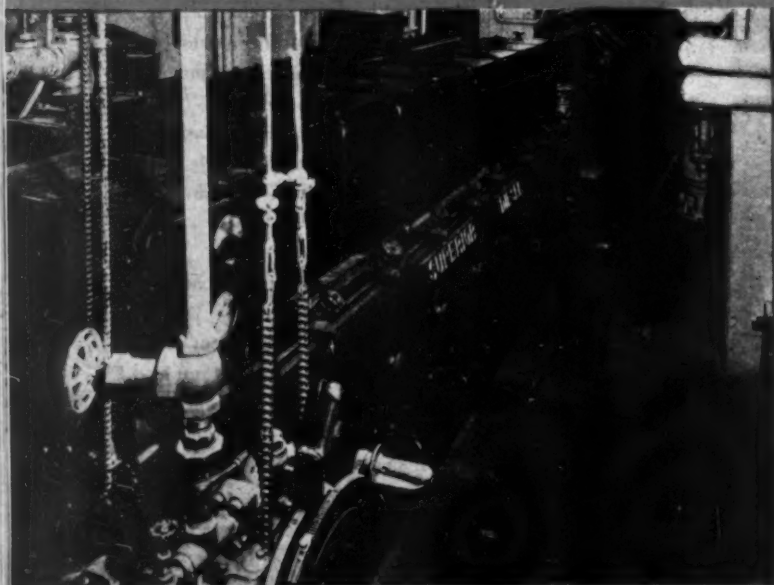
Close up of contra-flow rudder—the first installed on a clipper and its adapter, Naval Architect Art De Feur of Hodgson-Greene-Haldeman, builders and part owners.



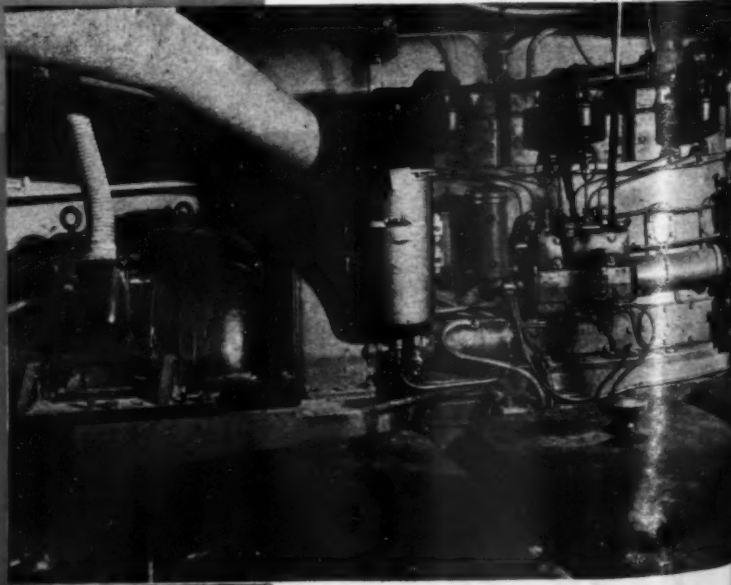
The 95-foot "South Seas," first of the fleet building for the 1944-45 season, all powered with Superior Diesels.

## NEW DIESEL FLEET FOR MEXICAN WATERS

By JIM MEDFORD



The main engine on the "South Seas," a Superior, 8-cylinder, 320 hp. Diesel. Note engine-mounted Alnor pyrometer above control station.



A pair of Superior Diesel auxiliary units like this are installed with F.M. Green Luber-finer lube filters, Purolator fuel filters, Leece-Neville starting, Bosch injection, Pierce governors and Air-Maze intake filters.

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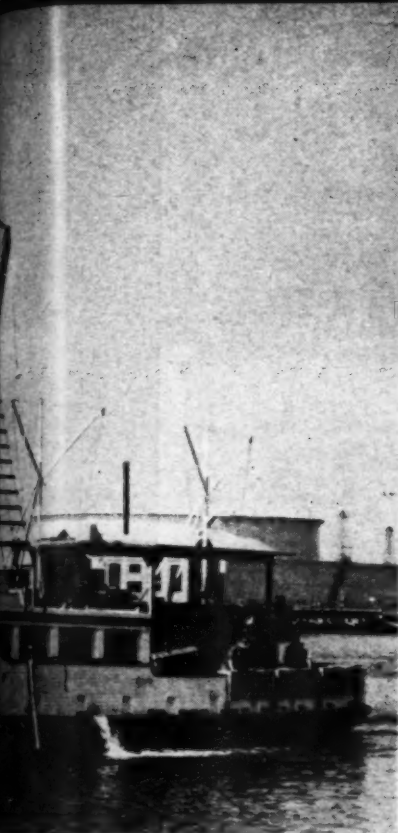


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**W**ITH the tuna clippers taking advantage of bonanza fishing in Mexican waters, making trips of from 10 to 14 days and coming in loaded from schools that are reported six miles long and containing tens of thousands of tons, *South Seas*, first of the new Diesel fishers completed for the Southern California fleet goes south for a fare that may reach a gross of \$50,000.

Constructed to carry 150 tons of refrigeration protected tuna, this 95-foot vessel is the product of Hodgson-Greene-Haldeman, Long Beach, California, from joint designs by Frank Hodgson and Arthur De Fever, president and naval architect, respectively, of the yard.

Of the triple deck type, now recognized as the most efficient, there is the main deck, raised or boat deck and Texas deck. There are 11 fish holds, including the three bait boxes on main deck, two steel combination fuel and bait well wing tanks and six wood bait wells, three port and three starboard, all below deck.

In addition there's one bow fuel tank and two stern fuel wing tanks. The total fuel capacity is approximately 18,380 gallons. Lubricating oil is carried in two fabricated steel tanks with a combined capacity of 150 gallons. Two cement washed tanks store 1800 gallons of fresh water.

The vessel has a pleasing profile creating the impression of seaworthiness not usually found

in a craft of less than a hundred feet. This is in a measure due to her slightly raked bow, well carried aft boat deck and enclosed pilot house with chart room on the Texas. The usual squat funnel houses the exhaust stack, with the crow'snest topped mast set at the after break of the Texas. Over the main deck bait tanks is a conventional wooden canopy so essential for bait protection from tropical sun's rays. The stern is a fantail and extra ease of handling with better speed is obtained by the installation of an especially adapted counterflow rudder, not uncommon on larger craft but for the first time hung on a tuna clipper, the idea of Naval Architect De Fever. The rudder is of composite construction—bronze post, wooden blade and brass casting off-set.

The main deck house consists of combination galley and mess room, refrigerator, toilet room, boatswain's stores and upper engine room containing engineer's tools and work bench on starboard side and refrigerator units on port side. The boat deck houses the radio room, two gear lockers and exhaust casing in addition to the accommodations for master, engineer and crew of ten men and last, but not least on a Portuguese-American boat, a chapel, without which no descendant of Columbus would sail.

Hull dimensions are 95 feet o.a., beam, molded, 24 ft. 8 in., and depth, molded at side, 11 ft. 5 in. Keel is a full length piece of 12 by 12-in. selected Douglas fir; keelsons are molded of 12 by 14-in., engine bed of 12 by 12-in., frames and other main timbers, all of same selected fir. Though the vessel is of wood construction, bulkheads on either side of galley on main deck, leading to upper engine room are of steel with steel waterproof doors.

The main engine is a Superior marine Diesel, direct reversible, starboard rotation, 8 cylinder, 81½ in. by 10½ in., developing 320 hp. at 720 rpm. with 2.54 to 1 reduction gear.

Two Superior Diesel auxiliaries, 6 cylinder, 5½ in. by 7 in., direct connected to Fairbanks-Morse 60 kw., 900 rpm., 220 volt, 60 cycle, 3 phase, 80% p.f., 75 kva. generators supply power for ships service. Fairbanks-Morse pumps and motors are used throughout the vessel, including motor-generator set for sonic depthfinder.

Because this tuna clipper is the result of the most careful planning on the part of the owner's syndicate made up of the builders headed by Frank Hodgson and the operators headed by Captain Vince Gonzales, the vessel's skipper, the arrangement of the equipment for fish

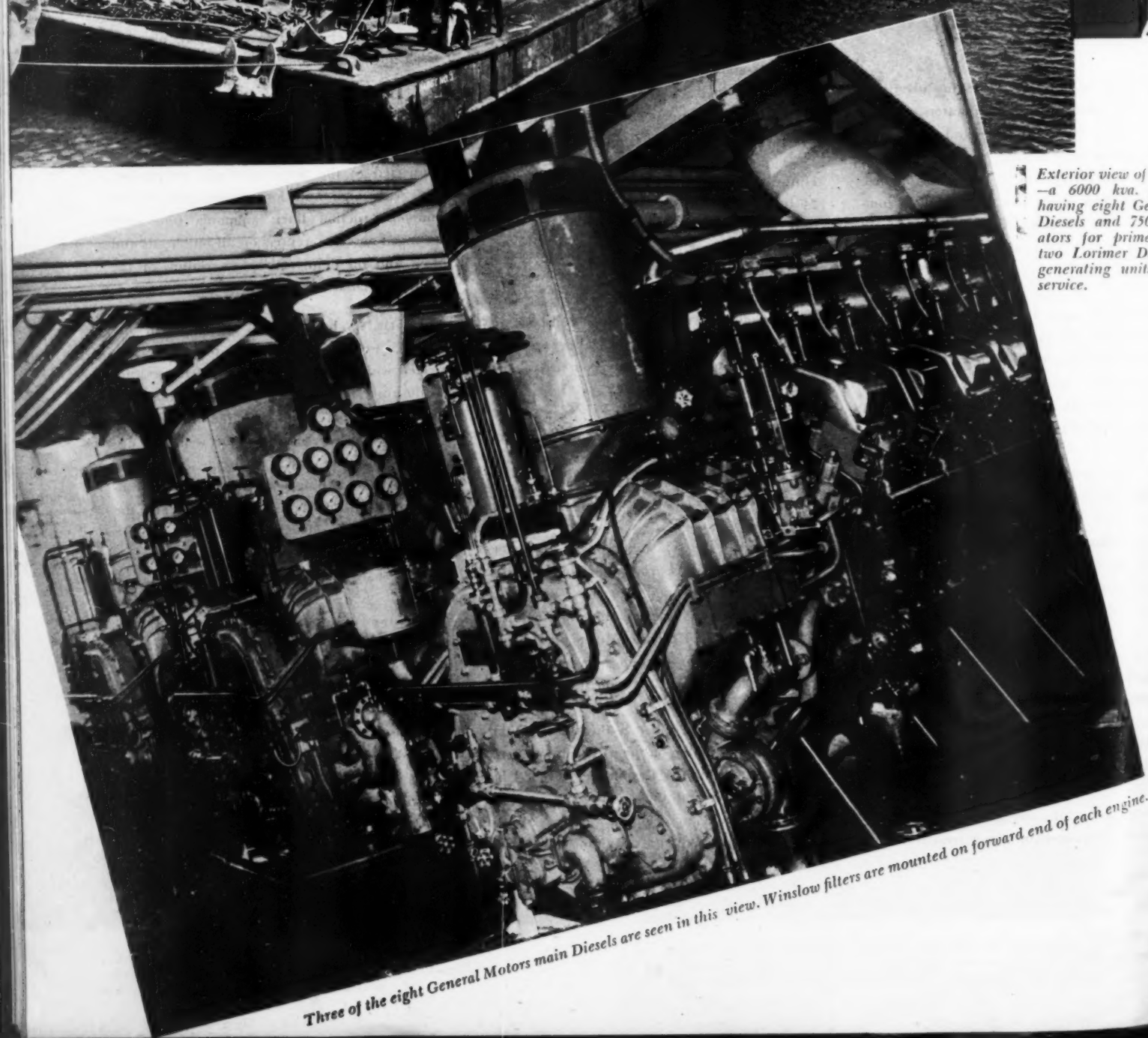
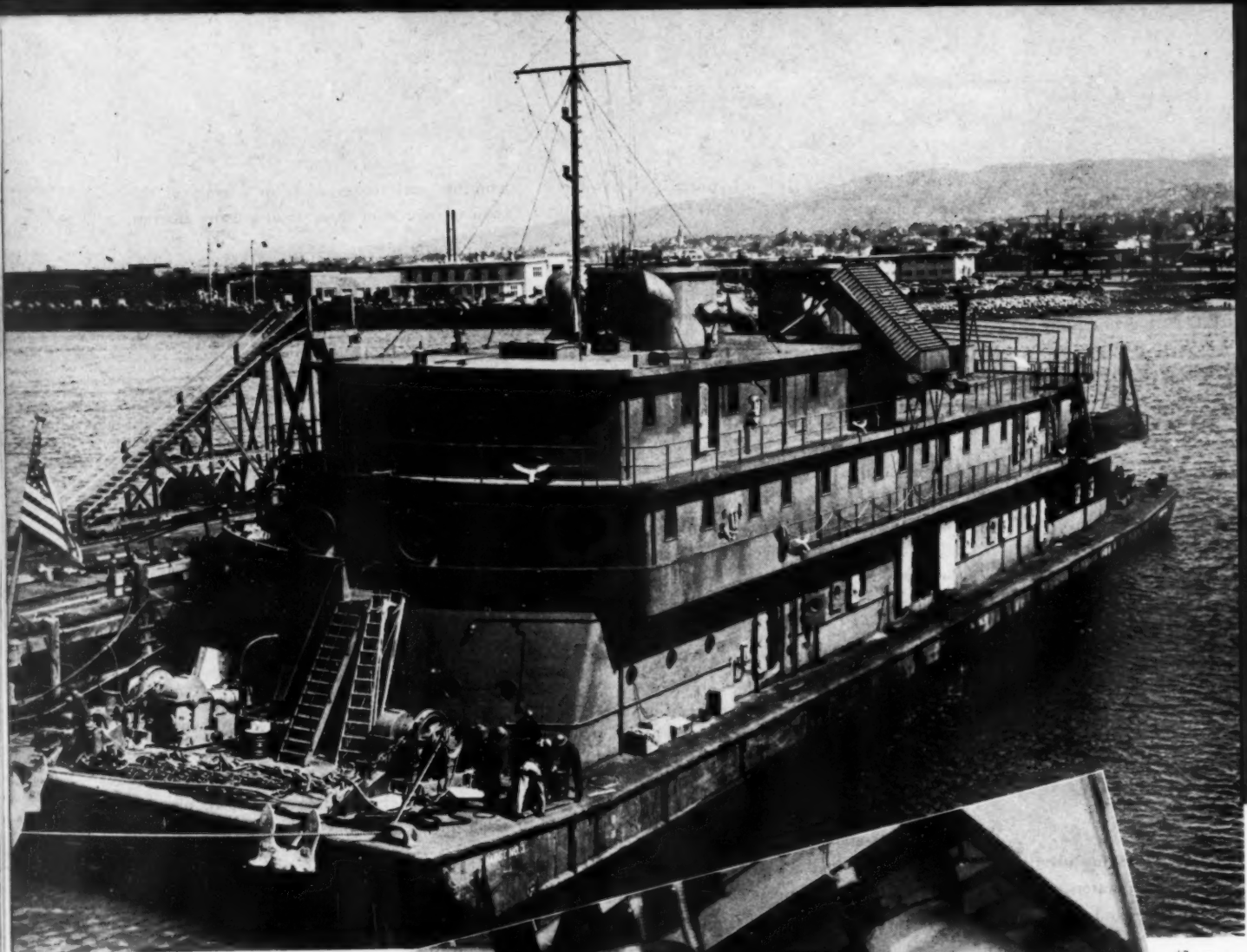
handling and refrigeration in a craft of this compact size is of more than passing interest.

As the fish come in over the rail they are tossed into sloping troughs placed on either side of the bait tanks and leading forward to the well hatches. When not in use these conveyors are folded and secured to tank sides, clearing passageway. The fish are then moved forward into refrigeration.

This refrigeration consists of three 4-cylinder, 3½ in. by 3½ in. ammonia compressors driven by v-belt from 15 hp. electric motors. Each compressor has a capacity when precooling at 45 lbs. suction pressure of 13.85 tons refrigeration, and holding at 25 lbs. suction of 8.85 tons refrigeration, when operating at a speed of 460 rpm. The condensing system is of the submerged type and is equipped with three vertical ammonia receivers approximately 12 in. by 7 ft. Water for the condensing system and compressor water jackets is provided from the bait line piping system. Of welded construction, there is approximately 2,400 feet of ¾-in. pipe divided into two sections. High and low pressure gauges are mounted on a central gauge board. All eleven fish containers, 8 fish wells and 3 bait boxes, are piped with approximately 5,000 ft. of 1¼ in. galvanized ammonia pipe, and connected to the three ammonia compressors and with high and low temperature valved ammonia suction lines; ammonia pipe coils arranged on 10 in. centers on all bulkheads and skin, and on 6 in. centers on ceiling of the wells and tanks.

Eight 1½ in. brine pumps are installed, one for each well, and two of these pumps are connected with valved suction and discharge lines to the three bait tanks. The brine pumps have 3 in. suction and 2½ in. discharge lines with the discharge line run inside of the well and discharging into the hatch combing. All suction and discharge piping is arranged for interconnection of all refrigeration equipment and the three compressors have a single high pressure cutout with gong alarm. All exposed suction lines in shaft alley are cork lagged.

In addition to the Superior Diesel engines and Fairbanks-Morse pumps, motors and generators, other equipment items include: American Hammered piston rings; Worthington air compressor; Luber-finer, Winslow and Purolator filters; Weston tachometer; U. S. gauges; Alnor pyrometer; Exide storage batteries; Penn electric alarms; Crane valves; Fulton syphon alarms on auxiliaries; American-Bosch fuel pumps; Pierce governors on auxiliaries; Lece-Neville electric fittings on auxiliaries; Joe's reduction gear.

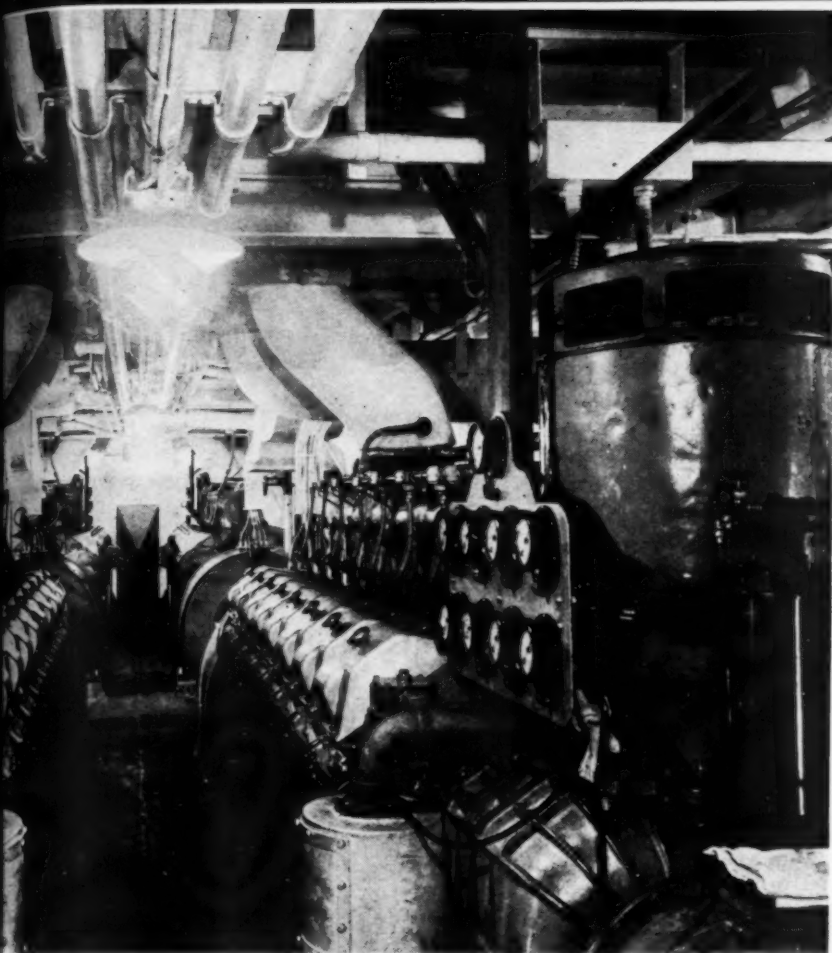


Exterior view of the "Elmer"—a 6000 kva. power plant having eight General Motors Diesels and 750 kva. generators for prime power; two Lorimer Diesel 150 generating units for service.

Three of the eight General Motors main Diesels are seen in this view. Winslow filters are mounted on forward end of each engine.

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The main Diesels are arranged in two rows of four each:—  
View looking aft between two pairs of General Motors engines.

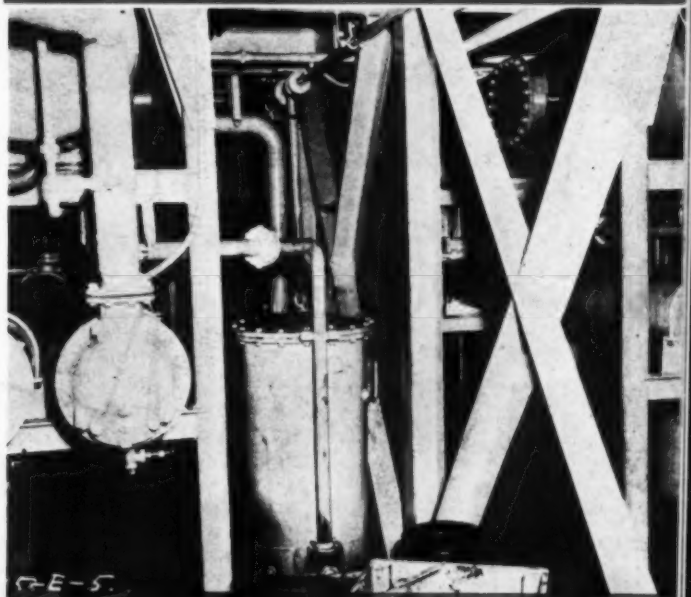
## A FLOATING DIESEL GENERATING STATION

By DWIGHT ROBISON

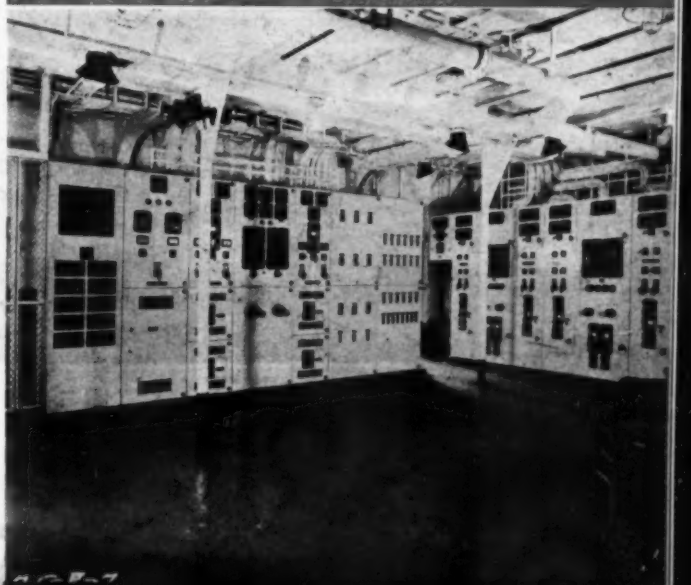
HERE is a typical example of the possibilities of multiple Diesel application—another outstanding case of electrically hooking up a number of standard, proven Diesel units in series to produce 6000 kva. total energy. The power barge, *Electra*, built for the U. S. Army Engineers by General Engineering and Dry Dock Company, Alameda, California, is powered by eight 16-cylinder, 2-cycle General Motors Diesels, each driving a 750 kva. generator, having a total output of 6000 kva. under standard operating conditions, but also capable of carrying 25% overload for peak conditions for a period of 10 to 12 hours. There are also two Lorimer, 8-cylinder Diesels driving 150 kw. generators installed for lighting and ships services. These units are rated to permit 25% overload for two hours and are mounted on Korfund steel spring Vibro-Isolators. Each of the ten Diesels is equipped with a Winslow Full Flow lube oil conditioner through which all lube oil passes on its way to the bearings. Fuel filters for the main General Motors Diesels are also Winslow whereas Purolator fuel filters in combination with Winslow secondary filters are fitted to the Lorimer Diesels. As an extra precaution to insure clean fuel oil a Winslow batch-type fuel filter is installed between the main storage tanks and the engine day tanks. Lube and jacket water cooling systems on the Lorimer Diesels are fitted with Thermx-changer coolers and Sarco blenders control engine temperatures. The Lorimer engines have Woodward isochronous governors, Air Maze intake cleaner-silencers, Alnor pyrometers, FAB flexible couplings, Tuthill lube pumps and American-Bosch fuel injection. Used as a power source for electric dredges, the "*Electra*" is an outstanding vessel of the type embodying tremendous concentration of power within limited space and certain flexibility in output attainable with multiple prime power units. The Diesels are all in one room with coolers, tanks and miscellaneous operating accessories below the engine room deck. With comfortable crews quarters located on the upper decks the *Electra* is an excellent example of advanced construction in floating power houses.



One of the two Lorimer Diesel general service generating sets on the "*Electra*."

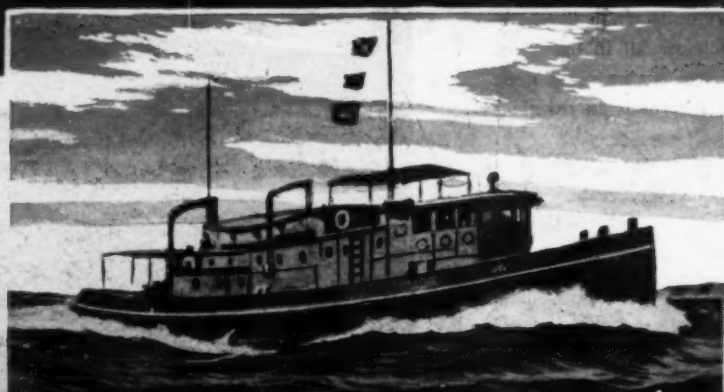
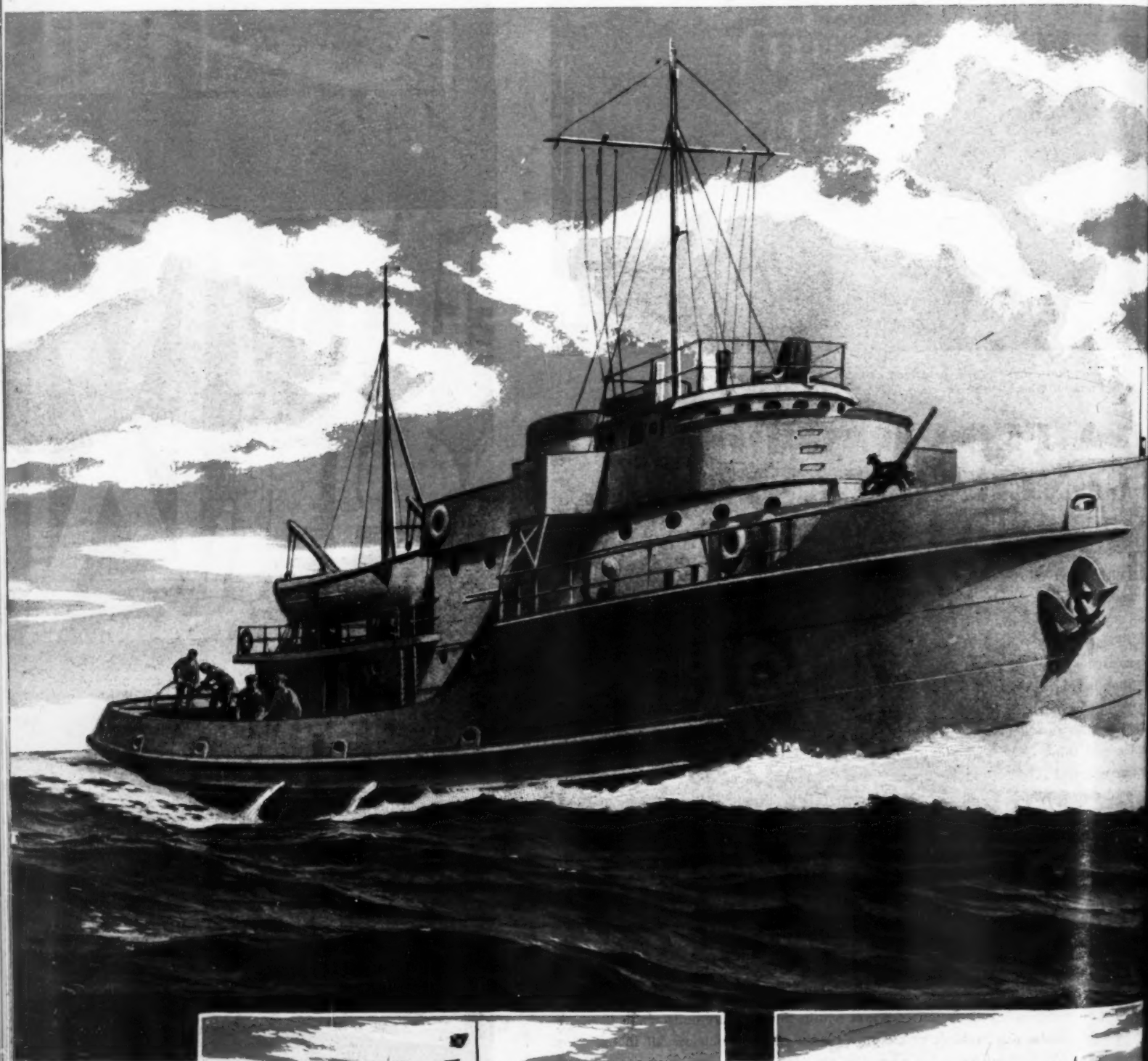


One of eight Winslow Full-Flow lube oil conditioners is installed for each of the prime power units.



The main Diesel generating units are installed in a separate room adjacent to the engine room.

# *Diesel-Electric*

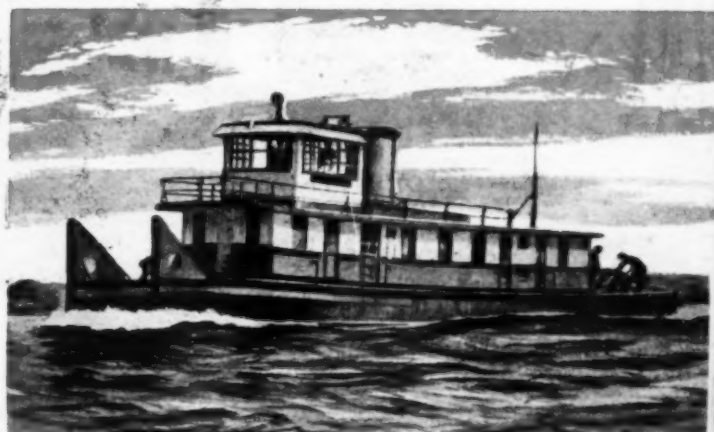
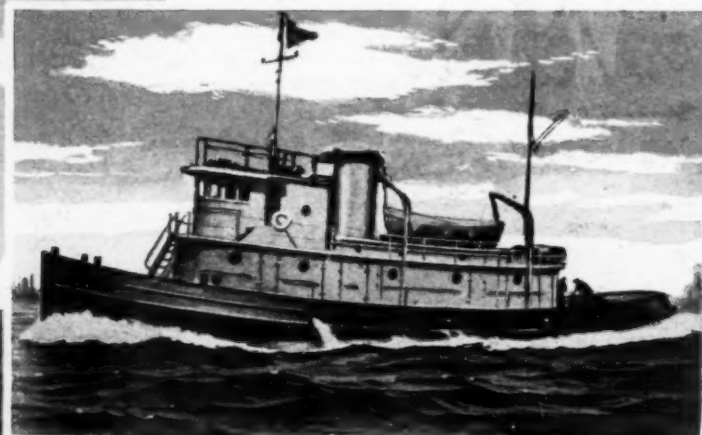




# Boats by GM



GENERAL MOTORS POWERS THESE DIESEL-ELECTRIC BOATS. SOME ARE SERVING ON THE HIGH SEAS. SOME DO HARBOR CHORES. BUT IN EVERY CASE, THEIR DEPENDABLE GM DIESEL-ELECTRIC DRIVE IS MAKING THEM OUTSTANDING.



ENGINES...150 to 2000 H.P. CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, O.

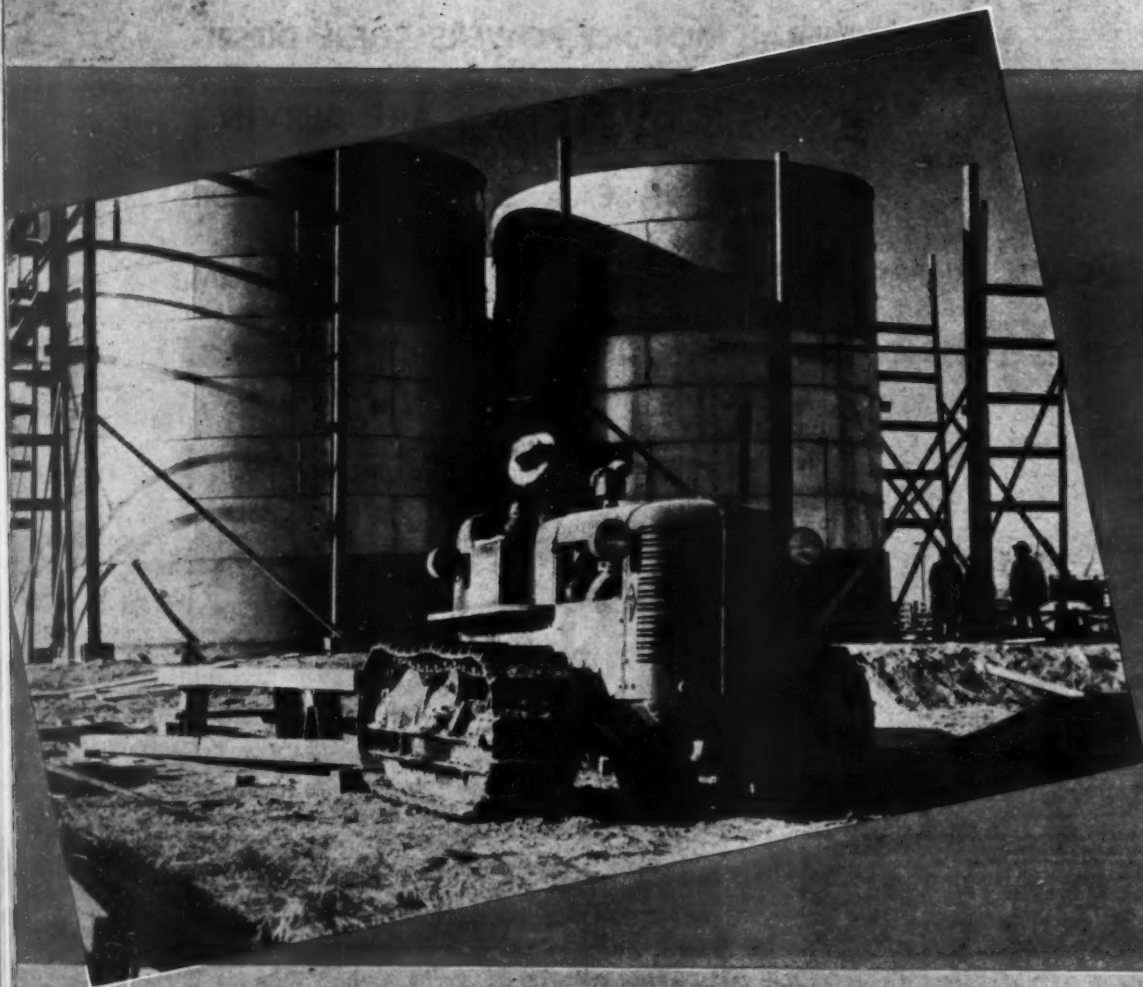
ENGINES.....15 to 250 H.P. DETROIT DIESEL ENGINE DIVISION, Detroit 23, Mich.

LOCOMOTIVES..... ELECTRO-MOTIVE DIVISION, La Grange, Ill.

KEEP AMERICA STRONG • BUY WAR BONDS

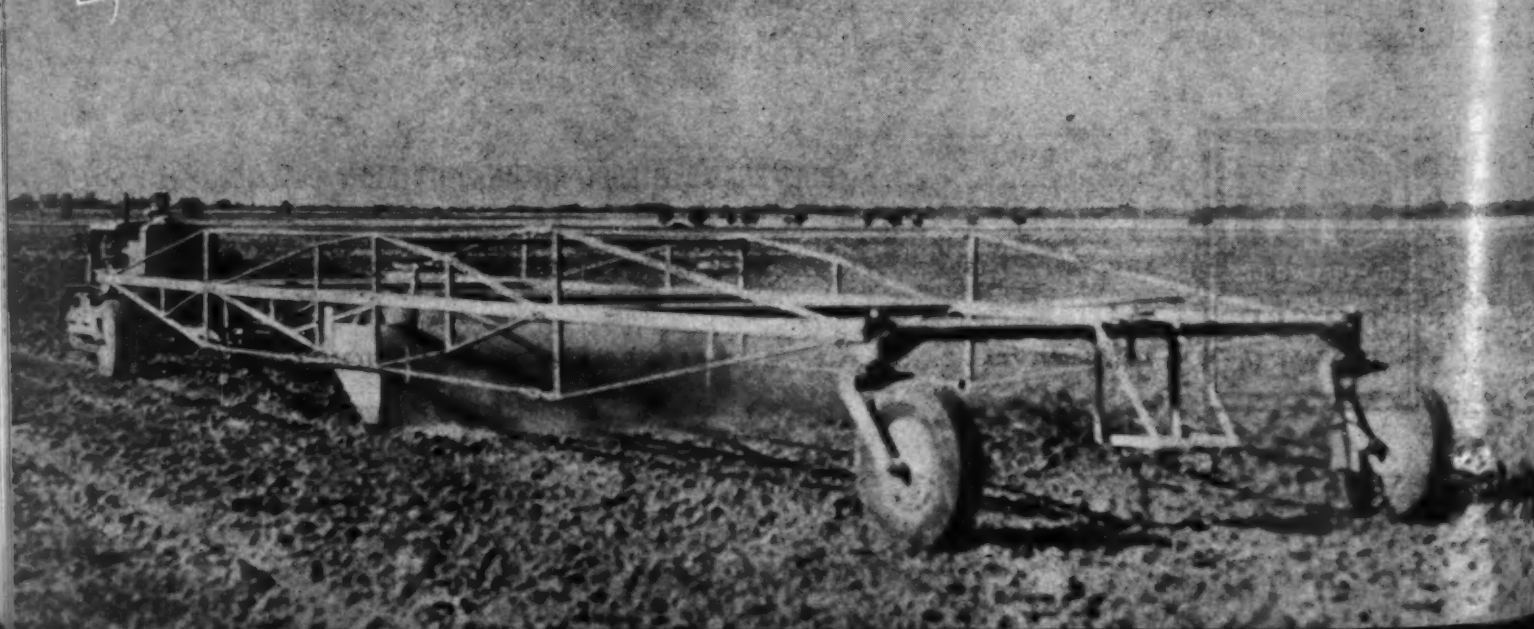


*Above: With Shasta Lake, 200 miles distant, providing water to this virgin land for the first time, this Caterpillar tractor and Le-Tourneau carryall are preparing a field for rice.*



*Left: This Allis-Chalmers tractor powered with a General Motors 71 series Diesel is toting lumber and steel for erection of a drier elevator on the new Van Dyke farm.*

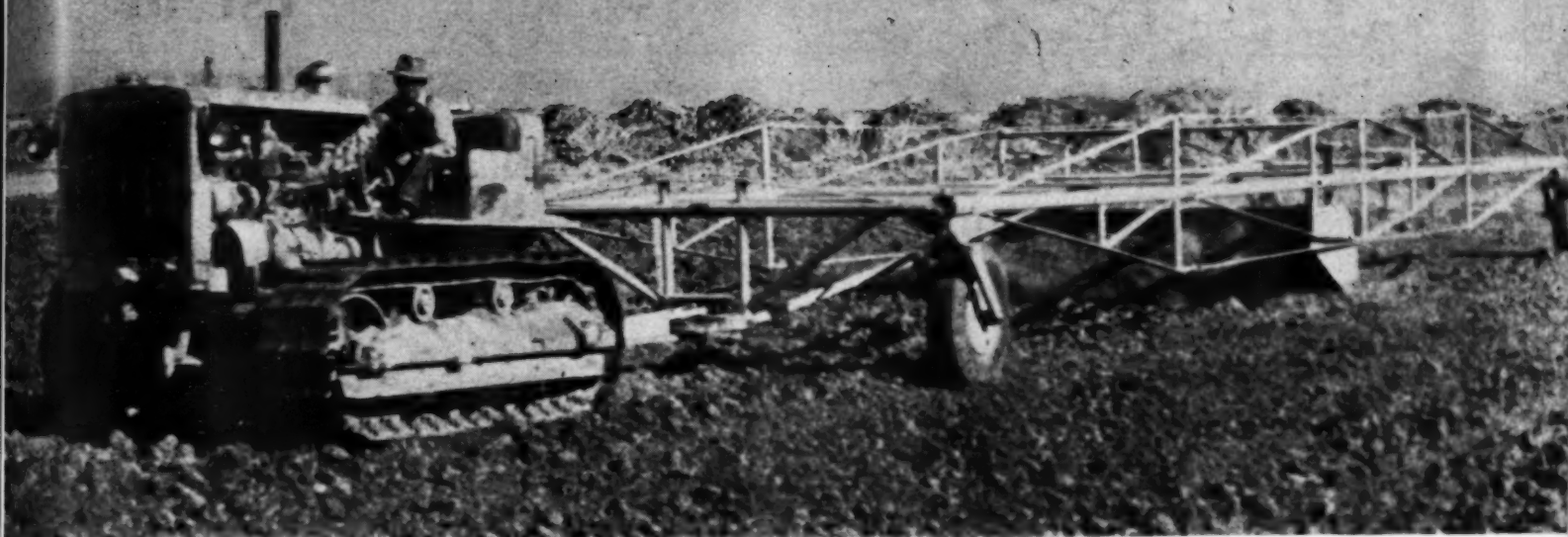
*Below: This is a "Dana plane" used for leveling virgin soil for the 1945 rice crop. Motive power is a Caterpillar Diesel tractor.*



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Front view of Caterpillar Diesel tractor hauling a "landplane" on the Van Dyke farm.

## DAM PLUS DIESELS ADD FARMS

By F. HAL HIGGINS

**S**HASTA dam, far up at the north end of the Sacramento valley, is near enough done to be storing up water to enlarge the irrigation areas over the famed valley of gold, wheat and rice. As the water backs up behind the great engineering project above Redding, California, more and more farm land is coming out of the marginal class and into the sure production class that insures bountiful crops every year. Since the Sacramento Valley is farmed by Diesel tractors largely under the old farming system for grain, as well as in the irrigated areas where enough water has been available to raise rice, peaches, beans, sugar beets, pears, etc., it is but natural to find the old Diesels that went onto the Sacramento Valley ranches hard at work taking on additional acreage under war conditions to enlarge farming operations. This is just what your Old Reporter encountered on a 2-day drive up the valley from Sacramento to Marysville and back.

First, the writer wanted to see the new rice and grain drier being erected by D. C. Van Dyke & Sons near Pleasant Grove, about half way between Sacramento and Marysville. This drier installation is the most important one of the kind going up in California this year where 75% of the rice crop is so handled. The drier was nearing completion, when seen the last week of August. It will be ready for the rice harvest in October. Labor for such construction work is scarce and more or less unskilled, but

the Van Dykes were going along OK with the crew they had assembled for the job. The one big piece of equipment that stuck out as one drove up to see the job was an Allis-Chalmers Diesel tractor. This carries the General Motors Diesel engine and still wore the drab olive green of wartime service. Incidentally, a Sea-Bee encountered on the trip just back from the north Pacific service where many crawler-type Diesel tractors had been available paid this same Allis-Chalmers Diesel tractor the compliment of being excellent in the cold Alaskan service where he had worked with tractors. "Don't know which is best in the hot climate, but I'll find out next trip out," he said.

The new Van Dyke Allis-Chalmers tractor was being used to drag pieces of material—timbers and metal—from piles to the place of erection where the home-made hoist on an old motor truck raised it to the men on the scaffolding above. As soon as this light construction is done the tractor will go out to the fields and work at plowing, levee building, leveling, etc. The storage space at this drier will be 1500 sacks a day with a capacity of 40,000 sacks. As the Van Dyke ranch is growing 700 acres of rice this year, the plant will handle the other crops of grain as well as some neighbors' rice for a nice income from both drying and storage. The Van Dykes are farming 6,000 acres. Young Van Dyke, who led the way out to the new lands being prepared for rice next year, listed

the ranch power equipment as:

- 1 Allis-Chalmers General Motors Diesel
- 3 Caterpillar Diesels
- 2 John Deere wheel tractors
- 2 Massey-Harris self-propelled combined harvesters
- 1 No. 17 John Deere combine.

We drove out to the flat new land being prepared to see the Caterpillar Diesels on Le-Tourneau 8-yard dirt carrier and Marvin Landplane. The two were doing a real job of getting this virgin rice land ready for a 1945 crop of rice. Twenty acres were to come in here for rice where there had never been rice because previous to Shasta dam there was not enough water. Rice is the crop that takes more water than any other. Hence, this area around Pleasant Grove was getting considerable new rice land with the completion of the Shasta dam 200-odd miles farther north. Also, some of this land was only \$20-an-acre land that was coming into rice. It would likely rise to \$50 to \$70 to reach other rice land values of the Sacramento. This gives an idea of what irrigation water means to thousands of acres of marginal land in the Sacramento. The fact that California since the 1940 census has jumped from fifth to third place in the state population rank in the U. S. means, of course, that farm land in this area is entering a new economic stage where less of its products will have to be shipped across the nation to a market.



The modern plant of B-W Superchargers, Inc., formerly McCulloch Engineering Corp.



Left to right; C. S. Davis, president of Borg-Warner, June Breckenridge, machine operator, Philip D. Armour, Borg-Warner director and R. J. Minshall, president B-W Superchargers, Inc.

**A** LARGE number of editors and writers of the industrial and business press recently gathered in Milwaukee for a conference on postwar trends in internal combustion engines with special reference to increasing their power by means of supercharging. The hosts were Borg-Warner Corporation and their Milwaukee division, McCulloch Engineering Corp., (Now B-W Superchargers, Inc.)

The representatives of the publications met principal executives of Borg-Warner and McCulloch at luncheon at the Wisconsin Club. In the afternoon the McCulloch plant was visited and the manufacture and operation of superchargers on engines for land and marine uses were explained. This plant was built just before the war expressly for manufacturing superchargers and is equipped with a full complement of high precision machines. When the conference was resumed at 4:30 P.M. at the

University Club, Mr. C. S. Davis, president of Borg-Warner Corporation, announced a change in the name of McCulloch Engineering Corp. to B-W Superchargers, Inc., effective at once. Mr. Davis and other executives talked briefly on the future of the internal combustion engine in the postwar world and the improvement in its power and efficiency that is being effected by supercharging.

According to Mr. C. S. Davis, president of Borg-Warner Corporation, wartime emphasis on engine performance has greatly stimulated interest in superchargers. He remarked that while production today is devoted to entirely wartime needs, there lie ahead very interesting questions of reducing costs and increasing engine efficiency through the use of supercharging wherever internal combustion engines are used. The tendency toward lighter weight engines will stimulate wider use of superchargers, in Mr. Davis' opinion.

Mr. Davis stated that the purchase of McCulloch Engineering Corp. by Borg-Warner marked their entry into the supercharged field, another step in their program of diversification and expansion in the automotive, aviation, tractor, and marine fields.

Mr. E. W. Wasielewski, Chief Engineer of B-W Superchargers, Inc., then addressed the group. He pointed out that the supercharger—"an air compressor for engines"—has in fact played an enormous part in the development of the airplane of today, particularly the high altitude military planes. During the first World War attempts were made to increase engine power with higher manifold pressures, but the principal concern was to prevent loss of engine power with altitude rather than to improve the performance of the engine at sea-level. The inter-

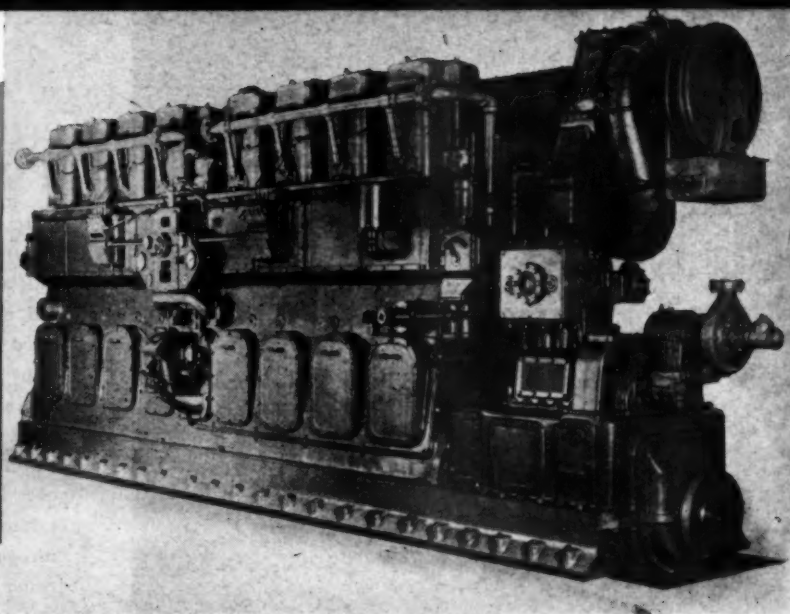
## USE OF SUPERCHARGERS EXPECTED TO INCREASE

est in supercharging lapsed for a long time after the first World War. Superchargers were used to some extent for airplane engines and on Diesel engines. Mr. Wasielewski stated that McCulloch Engineering Corp. were among the first to produce a centrifugal type of supercharger for automobile engines, some of which are still in use on passenger cars. He stated further that at the outbreak of World War II supercharging of airplane engines to give sea level power up to 12,000 feet was fairly common. The war brought with it a need for large numbers of internal combustion engines for stationary, marine, and transportation uses. The maximum possible power had to be obtained from these engines and supercharging was the obvious solution of this requirement. McCulloch Engineering Corp. developed and produced the positive displacement supercharger which they considered best adapted to these applications. Mr. Wasielewski said these superchargers are used today in a large number of engines, mostly Diesels, for high speedboats, landing craft, other marine uses, locomotives, and generating units for military installations of all kinds. The power of these engines has been increased by supercharging 20 to 30% and in some cases, considerably more. A large proportion of four-cycle engines in military service are now supercharged.

Although the increases in engine power so far developed by supercharging have been of moderate extent, there appear to be no obstacles to doubling engine power by this means, in Mr. Wasielewski's opinion. He remarked that there are some limitations on the amount that the power of engines can be increased by supercharging. This is particularly the case with the Otto cycle or gasoline engines, where manifold temperatures and pressures must be kept within . . . And now please turn to page 82 . . .



## THE PAST, PRESENT AND FUTURE



## OF THE DIESEL ENGINE

*An 8-cylinder, 4-cycle Cooper-Bessemer turbocharged Diesel developing 50% increase in output over its atmospheric counterpart.*

By RALPH L. BOYER\*

THE Diesel engine has been used, at least experimentally, in almost every conceivable power application, but that is no indication that it may be commercially practical in all of these fields. It has been successfully applied in the automotive and aircraft fields and from there on up to large central stations. While this discussion will cover briefly these two extremes, the intent of the article is to cover mostly the intermediate sizes of engines which have the greatest diversification of application and which have comprised the largest percentage of engine output. It is not intended to present technical details but more to emphasize general applications.

Without leaning too much toward fundamentals it might be well to mention briefly the underlying principle of the Diesel. There are other types of engines which also burn oil but which still cannot be classified truthfully as Diesel engines. The Diesel depends upon the basic principle of igniting its fuel by means of heat of high compression without any external aid. Low compression engines can be made to burn oil by securing ignition from uncooled surfaces which are initially heated by a torch or other similar means. There are also other successful oil engines which depend upon spark ignition.

The economy of an internal combustion engine is directly allied with its compression and from this fundamental comes the fact that the Diesel with its high compression is the most efficient prime mover so far known. Furthermore, one

very significant characteristic is that its fuel economy is obtained practically irrespective of engine size, so that the smallest automotive Diesel does nearly as well with respect to efficiency as does the largest central station Diesel. While this is generally true of other types of internal combustion engines, it is not true of steam power plants.

The Diesel principle does not tie the designer down to any particular arrangement as is evidenced by the fact that there are successful engines operating with horizontal cylinders or vertical cylinders; single cylinder or multi-cylinder, even up to as many as 32; single-acting or double-acting; in-line cylinders versus Vee type, versus radial; 2-cycle and 4-cycle; atmospheric and supercharged. In addition to the above, the 2-cycle types have been built with ported cylinders; with air valves and exhaust ports; with air ports and exhaust valves, and with opposed pistons. However the most common version of the Diesel engine is single-acting, vertical or Vee; multi-cylinder of from 3 to 8 in-line; or 12 to 16 Vee. Amongst these common types, the use of the 2-cycle and 4-cycle principle is virtually equal.

No article on Diesel engines, or even on their applications, would be complete without some mention of fuel injection, since that is the real heart of the Diesel. Since ignition is by means of heat of compression the fuel cannot be introduced into the cylinder until ignition is desired. Therefore, it becomes a matter of very quickly injecting this fuel at precisely the proper time and simultaneously atomizing it so

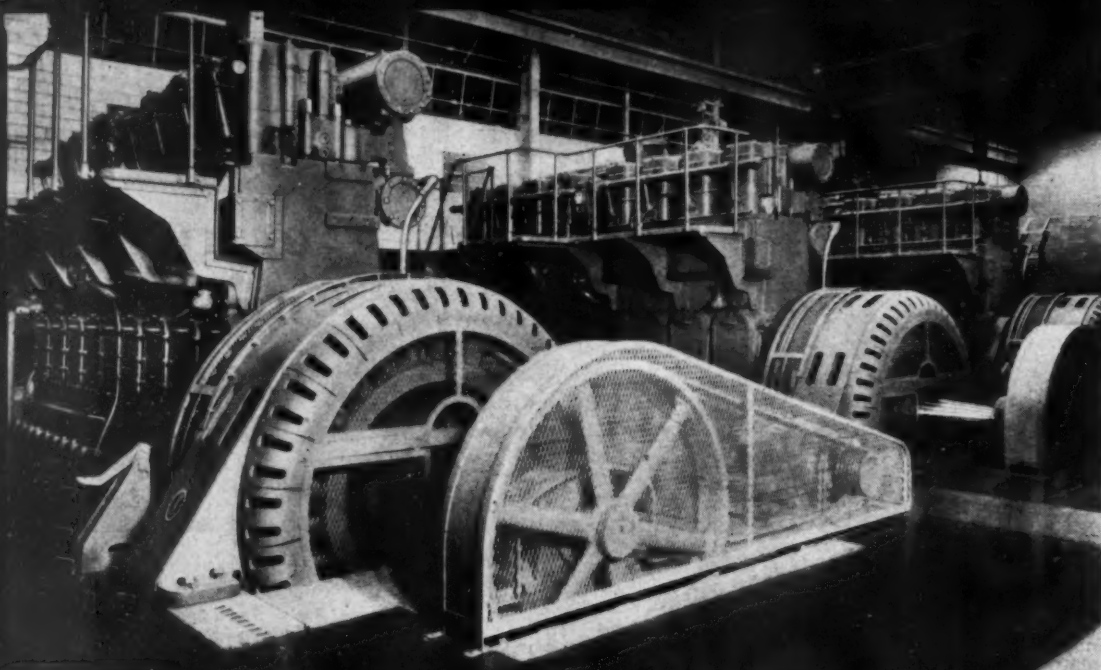
that complete combustion can result. The original method of blasting the fuel in by means of high pressure air has been universally abandoned in favor of driving it in mechanically.

There are two general principles of mechanical injection. The first consists of a quick-acting plunger which meters the proper amount of fuel and drives it through small orifices under high pressure. The second is by means of a single pump for the entire engine which maintains the desired pressure in the entire fuel system, the fuel being admitted to the individual cylinders by means of needle valves. The former is usually referred to as the individual pump type, and the latter type is usually referred to as some form of the constant pressure principle, or its modern version of controlled pressure.

During the past few years, as engine speeds and outputs have been vastly increased, great progress likewise has been made in the injection of fuel. There have been many refinements. The problem, compared to the carburetion problem of the gasoline engine, is apparent when one considers that with a 1200 revolutions per minute engine the complete fuel injection period is no longer than three thousandths of a second and that during that time a comparatively heavy fuel must be accurately metered and sufficiently atomized to burn completely with the air it encounters.

It is certainly not within the scope of this brief article to take sides in the eternal argument as to whether Diesel engines should be built for 2-cycle or 4-cycle operation. Both types are in very successful use, and while it probably can be shown logically that each type has its natural

\*Chief Engineer, The Cooper-Bessemer Corp.



A typical power plant consisting of three 1000 hp. Cooper-Bessemer Diesels. Extensive expansion in this field is anticipated.

field, even that phase of the matter will not be discussed. Since the 2-cycle engine produces twice as many power impulses, it tends toward less weight and less space, yet at the same time the supercharging of the 4-cycle engine, which has become practically standard practice, has so increased its mean effective pressure that the friendly race still continues. Although the 2-cycle engine can also be supercharged, it cannot be supercharged to the same degree as the 4-cycle and therefore the 4-cycle mean effective pressures are not obtainable in the 2-cycle type. It is suspected that far into the future we will continue to have both types on the commercial market.

The weight of the Diesel engine is frequently considered a disadvantage compared to the weight of some prime movers of other types. High combustion pressures, the result of high compression, logically necessitate heavier parts than those of the gas or gasoline engine. Again, however, tremendous progress has been made and the weights of yesterday do not apply today. It was not uncommon for early Diesel engines to weigh as much as 500 pounds per horsepower, but such ratios have not been applicable for many years. An engine's weight per horsepower depends quite largely on its size, since it is much more difficult to attain low weight per horsepower in a high-powered engine than in a smaller unit. Also, the weight per horsepower of course depends greatly upon the speed of the engine and its rating. With engines of intermediate size, 50 pounds per horsepower is easily attainable and 20 pounds per horsepower is even more common with such units

of the higher speed type. Even in these intermediate sizes 10 pounds to 15 pounds per horsepower is not too difficult to attain. On the other hand aircraft engines weighing less than 2 pounds per horsepower can be built in the Diesel type.

The records of Diesel engine performance are now such that the engine's reliability can no longer be questioned. In fact, Diesels present a very favorable picture in this regard as compared to steam power plants and certainly afford performance fully equal to that of natural gas or gasoline engines. In heavy-duty commercial applications it is not unusual to find heavy-duty Diesel engines operating more than a year without a shutdown.

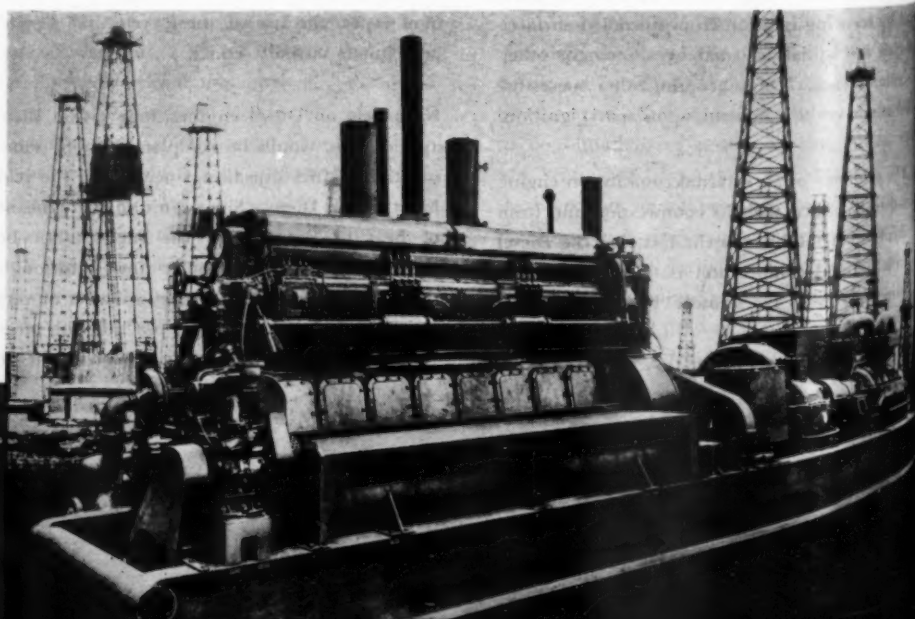
In the automotive field it is logical to expect the Diesel to find its first application where some additional weight can be tolerated and

where its fuel economy really counts. Heavy-duty trucks and busses with comparatively long hauls are all logical applications. Tractors and road machinery have been quite widely converted to Diesel and it may be expected that in the future we shall see almost universal application of these engines in these as well as in the heavier trucks and busses. This prediction does not apply to the automotive field in general. It is hardly likely that the Diesel will find its way into passenger cars, at least for quite some period of time. The present Diesel's greater weight and higher cost are alone sufficient reasons to forestall its use in passenger cars, but further than this, its gasoline competitor operates more quietly and the fuel economy of the Diesel is of comparatively little importance to the passenger car owner.

In aircraft, there seems to be every reason why the Diesel should enjoy a considerable application in the future, even though there has been relatively little effort devoted so far to aircraft Dieselization, particularly in this country. Diesel fuel is non-explosive and far less inflammable than gasoline. This safety feature alone makes the Diesel attractive in the aircraft field. Also the complete elimination of ignition and therefore complete freedom from radio interference is of some importance. While it is true that the Diesel will probably always weigh more than its gasoline competitor, the fact remains that due to its fuel economy the engine with an equivalent fuel supply may easily weigh considerably less. Again therefore the Diesel is particularly applicable to long distance runs just as in the automotive field.

The Diesels built for aviation use have been predominantly the radial and opposed piston type, the latter being the more common type used in German developments. As a matter of fact, Germany has made more progress in avia-

A portable and completely self-contained pipe line pumping unit employing a C-B 8-cylinder Diesel.





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tion Diesel development than we have. A study would probably reveal that this is due mainly to the difference in economics, particularly as dictated by Germany's supply of fuel oil versus gasoline. However, in spite of America's comparatively low gasoline costs and extensive refinery installations it is a general prediction that fuel oil will find its way into our heavy air traffic in the not too distant future.

The application of Diesel engines for stationary service has been quite general, including industrial plants of every type and a great number of municipal plants. These stationary engines have ranged in size from perhaps 5 horsepower up to 22,500 horsepower per unit. However, units within the 200 to 1200 horsepower range have constituted by far the great majority.

The actual operating cost of the Diesel is always lower, of course, than the cost of purchased power; and likewise the overall cost, including depreciation, maintenance, labor, etc., is almost always lower. The overall cost depends upon the depreciation rate and whether operating labor must be chargeable to the engine alone, or whether it is available from other processes.

The application of stationary engines to small industrial plants is seriously handicapped by the necessary initial outlay of money on the owner's part. To offset this some engine builders have arranged to finance the installation of their units, taking all of their pay out of the savings afforded in a comparison with the cost of purchased power. Furthermore, since the smallest Diesel and the largest characteristically afford virtually equal fuel economy this makes the Diesels very attractive compared to steam power plants.

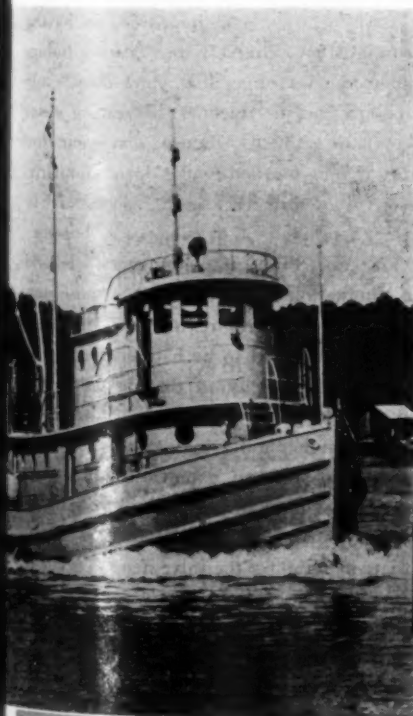
The oil field application of Diesels is usually referred to separately from that of stationary power plants, because the engine finds a much broader application in the oil fields—an application for which it is ideally suited. Drilling operations are now so extensive that some individual drilling units require up to 1500 horsepower or even more. This power may be provided by two or three individual engines for the sake of flexibility and portability. While most rotary drilling was formerly done with steam power, the internal combustion engine has now largely taken this entire field. In some cases the natural gas engine is preferred, but the Diesel has a more general application because its fuel can always be obtained, while there are many drilling projects where natural gas is not available. In rotary drilling the drives may be mechanical, or electrical, or a combination of the two, the latter being generally preferred at the present time.

Oil field pumping does not afford much of an application for the Diesel because the greater portion of pumping is done by means of small individual engines almost always operating on gas from the individual wells. Usually, centralized power for electrical pumping is also provided by means of natural gas engines since the power station is sufficiently close to the field to obtain adequate gas automatically. However, oil line pumping is another matter, and oil line engines are almost always Diesel.

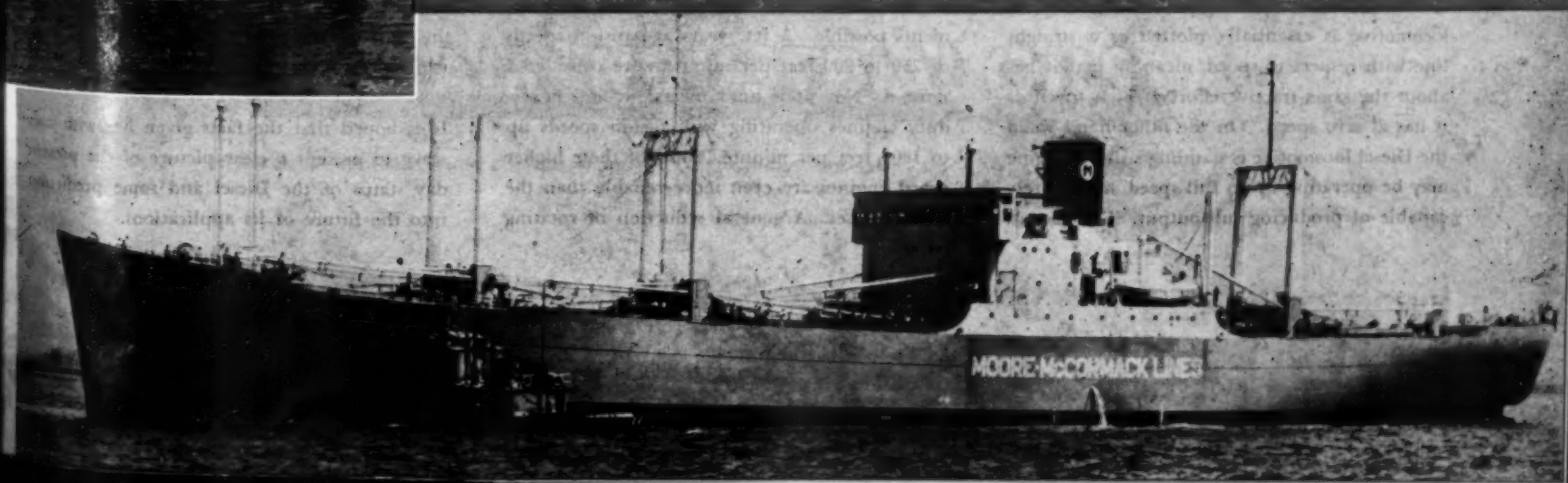
Aside from the small gathering lines, the lines are powered by main engines usually rated 300 to 800 horsepower per unit; and crude oil is the prevailing fuel. Formerly, the Diesels drove reciprocating pumps, but now Diesel-driven centrifugal pumps, with step-up gears, have been almost universally adopted.

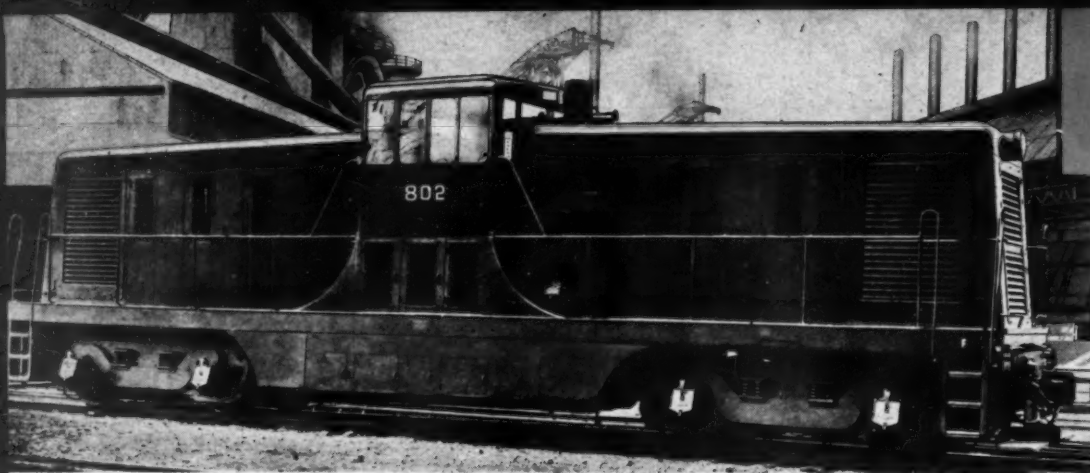
The marine field is another natural one for the Diesel engine. There it can have no power competition whatever and natural gas cannot be piped to marine power plants. While the largest marine power plants are still steam and probably will remain so, it is believed that Diesel marine plants up to 15,000 horsepower in twin screw, or twice that in quadruple screw, are generally thought of as being quite practical. However, even if the larger plants do remain steam, by far the greatest use of Diesels in the past and probably in the future will be from 3000 horsepower down in size. This includes fishing boats, tugs and tow-boats, river boats, yachts, etc. Coast Guard and Naval applications of Diesel power are extremely extensive. It is interesting and significant to note that although all of the largest marine power plants of the Navy are naturally steam, that this year the total Diesel horsepower in our Navy surpassed the total steam horsepower.

In the past a high percentage of Diesel marine propulsion has been by means of direct propeller drive. This naturally necessitates a direct-reversing engine—one which is entirely practical and with a maneuverability at least equal to that of a steam engine. The very small engines have been applied by means of reverse gears, of course, so that the engines turn in one direction only. Full Diesel electric drive has enjoyed favor for certain classes of vessels requiring an unusually high degree of maneuverability but has not been widely applied due to its higher cost and less efficient means of propulsion. However, Diesel generating sets are very extensively used for auxiliary power, emergency power, and ship's service aboard vessels from



The vessel left and below exemplify the wide range of Diesel marine applications open to exploitation. Both vessels are completely Dieselized as to propulsion and auxiliary power.





*The transfer-type locomotive falls between the smaller switching types and the streamlined road units. It is powered with two Cooper-Bessmer Diesels.*

the largest to the smallest, regardless of the type of main propulsion engine used.

In order to effectively apply the newer high speed engines it is necessary to resort to gears for marine propulsion, since propeller speeds are definitely limited and the high speed engine geared to the propeller seems to be gaining considerable favor. Nevertheless, there is doubtless very great need for the development of a satisfactory transmission between engine and propeller in order to utilize fully the development of the high speed engine.

The railroads offer almost as natural an application as the marine field. Steam, although the standard of the past, is losing favor quite rapidly not only for switching engines but also for main line locomotives, particularly for freight transportation. The steam locomotive is one of the most inefficient power plants known. Were it not for the fact that it is able to handle cheap coal, it would not have maintained its position as long as it has. The public has demanded that steam locomotives burn a cleaner fuel, and consequently many roads have converted completely to oil. With that condition existing it is natural to expect that the roads should now lean toward the Diesel with a tremendous saving in fuel. Considering the relatively small number of steam locomotives that burn oil today it is significant fact that if all of the railroads of this country were completely Dieselized the total oil consumption would be actually less than it is now. Moreover the maintenance cost of the steam locomotive is extremely high with a correspondingly high "time out for service" as compared with the Diesel locomotive which has already proved itself in this regard.

Tractive effort or "pulling power" of the steam locomotive is essentially plotted as a straight line with respect to speed, meaning that it has about the same tractive effort at high speed as it has at zero speed. On the other hand when the Diesel locomotive is standing still, its engine may be operating up to full speed and entirely capable of producing full output. This means,

therefore, that its tractive effort is tremendously multiplied at low speeds. This gives it an accelerating advantage which is particularly noticeable in the case of switching locomotives where a comparatively small size Diesel switcher can outperform a steam locomotive of two or three times its rated horsepower.

Electrification of railroads is not expected to be severely competitive to the Diesel in the future. While electrification will be extended somewhat, its first cost is so excessive that individual train power plants will be more attractive. It seems impractical to construct vast electrical systems to distribute power from central stations, when the most efficient prime mover can be installed on the locomotive and thereby generate its own power directly.

In general, switching locomotives range in size from 300 to 1000 horsepower. Main line locomotives range up to about 6000 horsepower. The main line application of the Diesel has been a challenge to engine builders because the engine must be comparatively light in weight and occupy relatively small space. This means high speed and high ratings, yet the engine must be fully as durable and reliable as a stationary power plant. A general prediction is that it is only a matter of time until there will be no switching locomotives of the steam type, and that before very long a large percentage of the main line locomotives likewise will be Diesel.

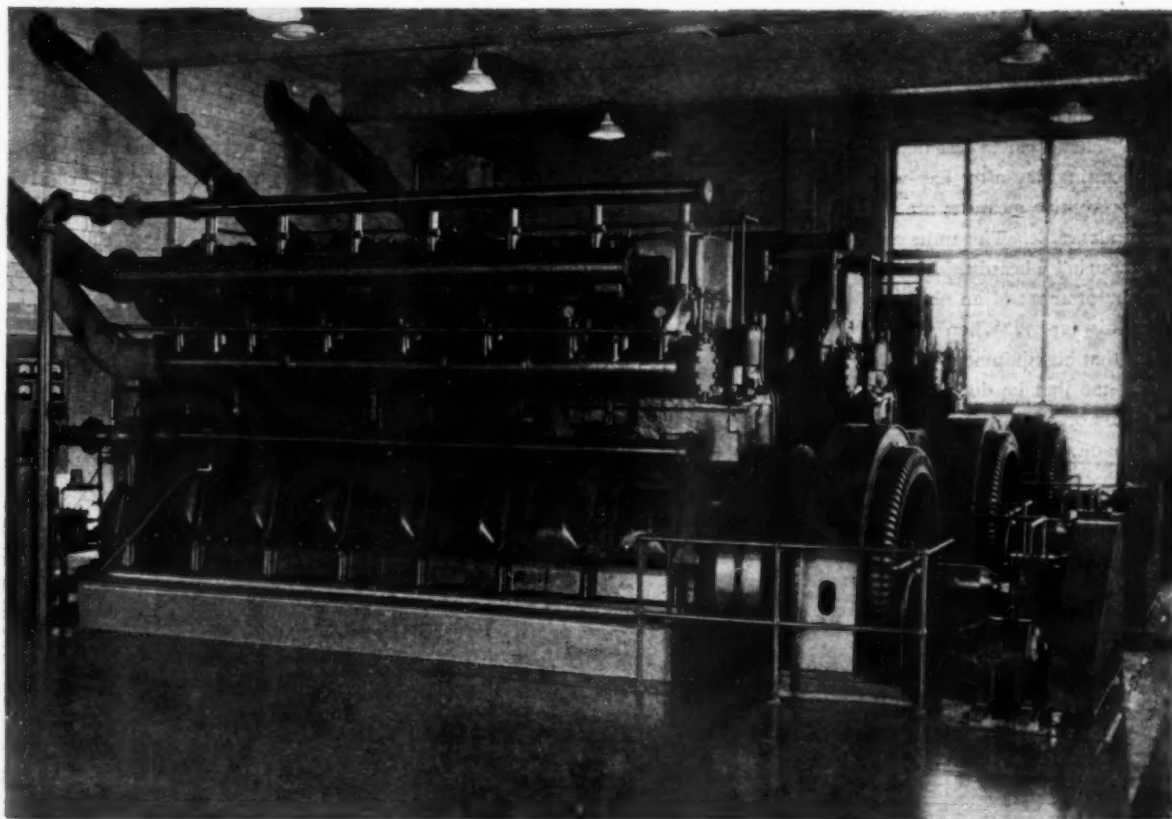
In all of the above considerations it is apparent that the trend of Diesel design is to less space and weight for given horsepower, which means more speed, higher mean effective pressures, and more cylinders. While we are not concerned here with technical problems, it might be in order to mention a few of the general design considerations that have made these developments possible. A few years ago piston speeds of 750 to 900 feet per minute were considered normal. Now it is not unusual to find heavy-duty engines operating with piston speeds up to 1800 feet per minute. Some of these higher speed engines are even more reliable than the former types. A general reduction of rotating

and reciprocating weights has been necessary. This has been accomplished not only by the use of lighter materials in many cases, but as the result of a great deal of research leading to better design, better stress distribution, etc. This is particularly true of pistons which make up the larger percentage of reciprocating weight and which today weigh only a small fraction of the weight thought normal just a few years ago. In many instances it has been found that piston materials could be reduced in thickness advantageously, since by so doing, heat stresses were lowered. In the meantime piston cooling has been employed, permitting much higher ratings without piston ring difficulty. Over a period of years piston rings have been thinned down, and it has been proved that they seal just as well and cause less wear. Cylinder materials have been improved until we are now experiencing less cylinder wear on the high speed engines than we did on the lower speed units. Likewise, cooling systems have been greatly improved, affording better circulation with less evidence of hot spots. It has been found that the use of large quantities of cooling water, resulting in low temperature differential, has been very beneficial. It has also been found that higher temperatures could be employed to advantage since with enclosed engines condensation occurs if the water temperatures are carried too low. Bearing design and bearing materials have been greatly improved, it having been found that extremely thin bearing linings are many times stronger than thick ones. Only a few years ago the thickness of bearing metal was perhaps  $\frac{1}{8}$ -inch, whereas that same size bearing is now frequently .005 inch. Similarly, dovetails were formerly considered essential in securing babbit to a bearing shell, but they have long since been completely eliminated and their elimination results in a much more durable bearing. Furthermore, it was once thought that all bearings had to be hand-scraped to be good, but we have found that precision machining without any hand-work whatever results in a far better bearing. Valve design has progressed to such an extent that it is now possible to employ heat-resisting materials in the valve proper but with another more appropriate material for the valve stems. Torsional vibration is no longer a mystery, for it is now an everyday practice to determine on paper the exact vibration points of an installation with which we have had no previous experience.

It is hoped that the facts given herewith may serve to present a clear picture of the present day status of the Diesel and some prediction into the future of its applications.



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## "SALVAGE IMPORTANT IN PLANT MAINTENANCE"

Conducted by R. L. GREGORY\*

**A** PROPER method of "salvage" plays an important part in cutting the maintenance costs of any plant equipment. This is particularly true of Diesel maintenance, since there are many parts of your units which can be given longer wearing life and put in good operating condition, if such material or parts are watched and taken care of at the proper time and in the proper method.

Many supervisors and engineers are too negligent along this line. They seem to feel that as long as they are operating day after day with no difficulties, that preventive measures are not necessary and are undesirable. The units are, so to speak, "good enough." I heard this remark made one time in the presence of an old engineer and this was his reply, "When a man makes the statement that his equipment is 'good enough' it convinces me that he doesn't know the definition of the words. This term when applied to any mechanical equipment, is used merely to indicate, that the user is too negligent to make it right."

Now possibly that old timer had "something on the ball" when he made that statement. Equipment must be watched and taken care of and "good enough" is not sufficient for good operating practice and low maintenance costs. Let us just take a few examples of how, by proper salvage methods, maintenance costs can be reduced. We have all experienced the wear and tear on needle valves in operation. This wear occurs at two definite points. First on the needle valve stem seat itself. The valve stem in passing up and down through the valve packing with each revolution of the engine is subjected to wear. In several issues of DIESEL PROGRESS, under this section, our readers have given various methods of rebuilding worn valve stems.

The point that the writer wishes to make is that these valves can be made to last many years if removed periodically and repaired, the method of repair adopted matters little, although some of those used in more recent years, have given better results. Every unit should have a few extra needle valves as spare stock.

\* Chief Engineer, Municipal Water and Light Plant, Hillsdale, Michigan.

One of the best methods of renewing the stems at this point is by metal spraying. Worn mechanical parts have been renewed by this method for several years, but during the past few years when materials and new equipment have been hard to procure, engineers have developed a metal which has given much better wearing results for this type of equipment. They will take a worn valve stem, clean it, spray it with this metal until it is built up sufficiently, then grind and polish it to the original size of the stem, and experience has proved, that a valve stem so repaired, has longer wearing qualities, and gives better service, than the original stem did.

As to the cost of such a repair, it has also been proven, that it is much cheaper, when the longevity of the repaired valve is considered, than it is to purchase new valves. Another point to be considered is the second point of wear, namely where the valve comes in contact with the valve seat. The amount of wear at this point also depends upon the hours of operation, but fuel conditions play an important part with the wearing conditions.

When a needle valve is removed, it should be thoroughly inspected at this point of contact. We have all experienced finding these points chipped or badly worn by the constant pounding of the valve upon the seat.

If the seat is found to be badly worn, it should be reamed out again to the proper angle. If the valve is worn it should either be replaced or if time permits the point can be built up and machined or ground to the proper angle, then lapped in with the seat. If these measures are faithfully followed, maintenance costs on needle valves can be greatly reduced.

Another example of salvage may be cited in the matter of piston rings. There has been much discussion on the subject of reusing piston rings once removed from a piston. Many engineers claim that this is bad practice but the writer feels that there is some merit to reusing piston rings, under certain conditions which are as follows. Suppose in an overhaul of a unit, a complete set of new rings is installed on a piston, or say complete sets of new rings are installed on all the pistons.

After operating for several months, some pistons may give indications of blowby and when it is removed, you find the top rings broken. You then remove all the rings and find that two or three of the lower rings still have a good amount of tension, with proper end clearance. This in most cases is very likely to be the condition, since the top rings are subjected to more heat and greater stress than the lower ones, they are more likely to loose their tension first. These bottom rings may be worn just enough so that the end tolerances are a little too great for their particular groove. But since the end tolerances are larger at the top grooves than at the bottom, there is no reason why they cannot be moved up a groove or two on the piston providing the tension is still good, say to groove 3 or 4. They can then be run for a few months longer and give added service, instead of being discarded.

Now there are many engineers who do not approve of this practice. But piston rings cost money, and if enough additional service can be secured by juggling the rings around in various grooves to warrant a few more months wear, without sacrificing economy, then the writer contends that over a period of years considerable saving can be accomplished by reusing these rings.

Another item of salvage which can cut maintenance costs is that of valves. This is especially true in air injection engines having several stages of air compression. In the higher pressure lines, such as blast lines, high pressure valves are subjected to severe service. By periodically removing these valves and lapping them in or regrinding them, many valves can be kept tight and kept in use for years. If allowed to go until they are badly cut or worn, other parts may become defective, to such an extent that they must be entirely discarded and salvage is out of the question.

The cost of valve replacement is a big item in many plants and to keep it at a minimum, it is absolutely necessary to inspect and regrind them at intervals. A valve reseating unit and repair kit is a handy piece of equipment in the maintenance tools of any plant and should be made use of frequently.

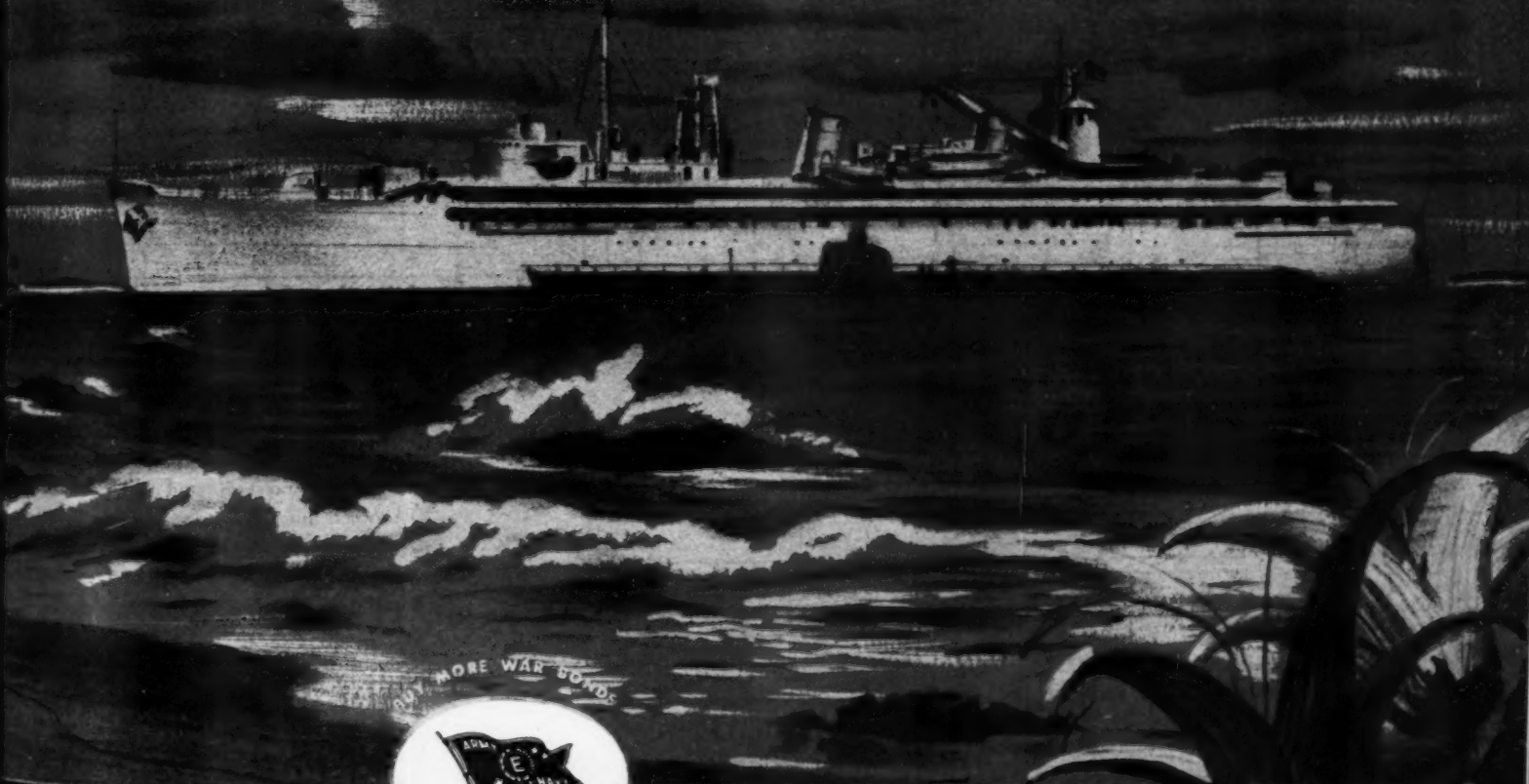


ON

# MARQUETTE HYDRAULIC GOVERNORS AND OVER-SPEED TRIPS



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EL PROGRESS

# Exchange Your Diesel Maintenance Ideas

Conducted by R. L. GREGORY

*Editor's Note: In this department we provide a meeting place where Diesel and Gas engine operators may exchange mutually helpful maintenance experiences to keep our engines in top condition. Mr. Gregory edits your material and adds constructive suggestions from his own wide experience. This is your department—mail your contributions direct to DIESEL PROGRESS.*

## How To Make and Use a Strain Gauge

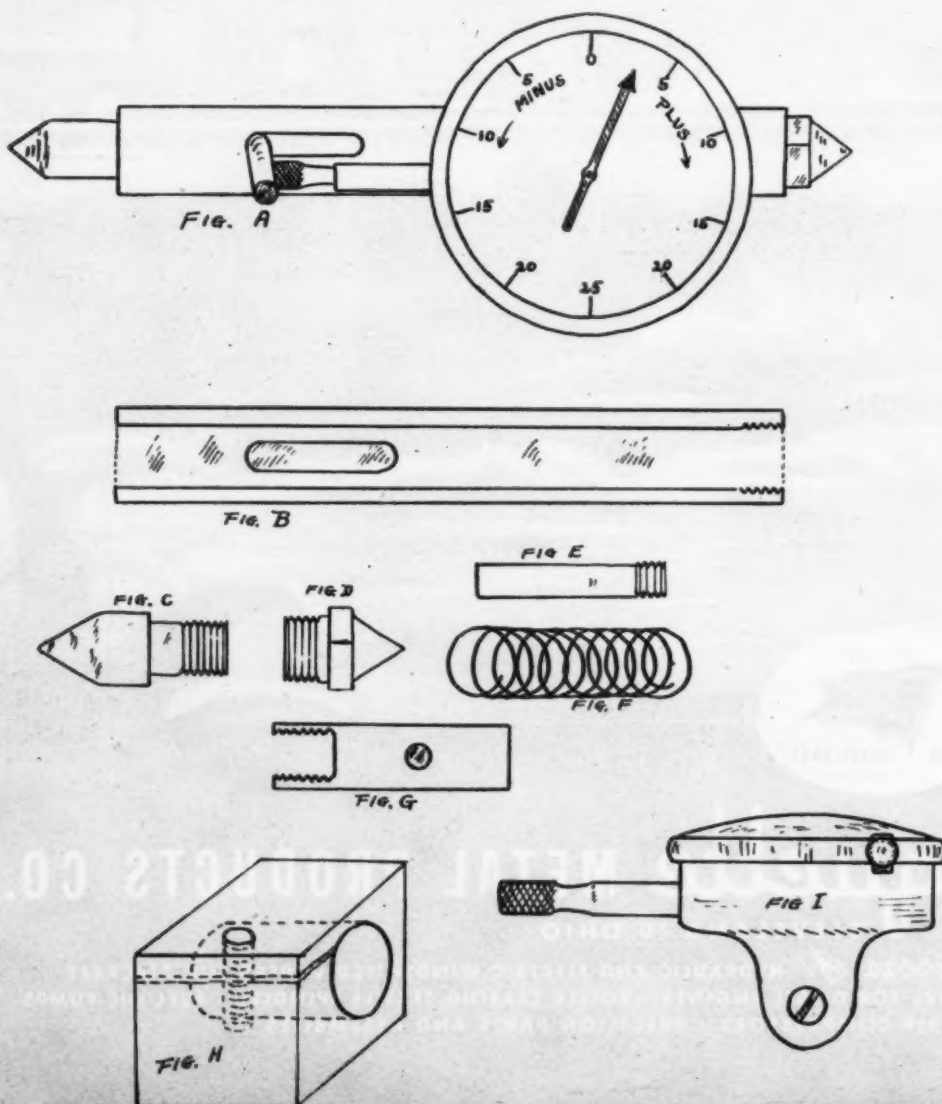
SOME time ago we noted in DIESEL PROGRESS magazine articles on the use of a strain gauge, and in a recent issue a picture showing the use of said gauge, but most operators will be unable to procure one nowadays, and with this note we enclose drawing of one I made several years ago. If a gauge cannot be purchased, most operators may be able to borrow one from their neighboring garage, and it is a simple matter to take off and return.

Fig. A shows what the completed gauge looks like when assembled. Fig. B was made from stock steel, completed measuring  $\frac{3}{4}$ " with seven sixteenths inner bore. The elongated hole is  $1\frac{1}{4}$ " from the end,  $\frac{3}{4}$ " long. Fig. C may be made to any length to fit different size webs, and threaded into piece, Fig. G which has a

$\frac{1}{4}$ " threaded hole. Fig. D is made to fit the threaded end of Fig. B. Fig. E is a  $\frac{1}{4}$ " rod  $1\frac{1}{4}$ " long, threaded to fit Fig. G which is made to fit in barrel of Fig. B and is 3" long. Fig. F is a coil spring that will fit in barrel of Fig. B, and has enough tension to hold gauge between webs. Fig. H measures 1 inch square, and has hole bored through to slip over barrel of Fig. B, and has a quarter-inch threaded hole to hold gauge and also tighten around barrel, one side of square being slotted with hacksaw. Fig. I is side view of automobile inside cylinder gauge.

Two center punch marks are made on web opposite each other when web has just passed upper center by rod, and readings may be taken for almost a complete turn. We use a small round mirror, and read the gauge for the complete turn while one operator revolves the engine.

(Signed) ERNEST E. DIDIER  
Supt., City Light & Power  
Osage City, Kansas

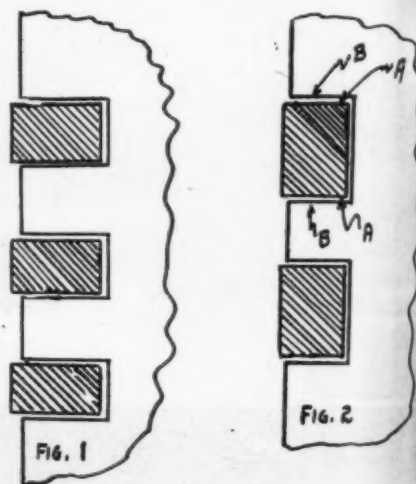


## Piston Rings

DUE to the increased application of Diesel as prime movers for various types of equipment in carrying on the present world conflict, and the increased production of all types and sizes of Diesel units, to fit in with our war program manufacturers of Diesel units have spent much time and money in experimental work.

The writer would like to give one example of a change which has taken place in the design and operation of piston rings as used in some of the small higher speed units now being used.

The design of a piston ring, requires that it be strong, tough and have proper tension under operating conditions to spring outward toward the cylinder wall, stopping leakage and blowing. Years ago designers felt that these rings should



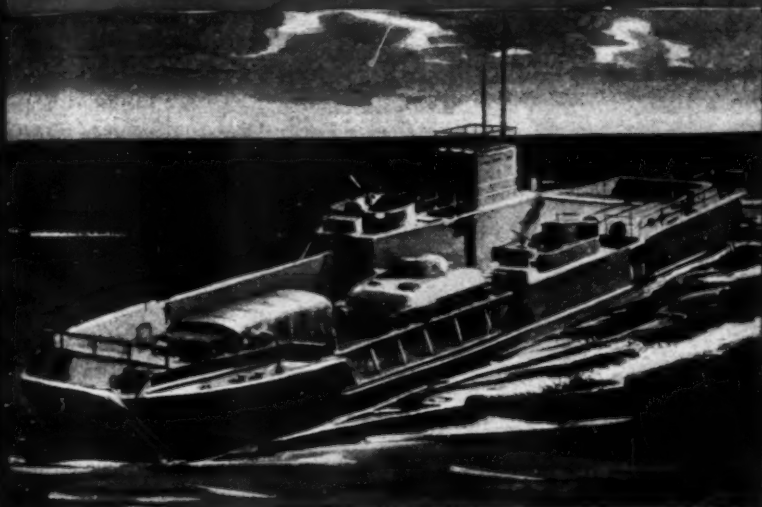
be made of a metal of slow wearing qualities but also have the quality to keep it from scoring in its travel up and down the cylinder. Another function of the piston ring was the proper transfer of heat. In practically all piston ring design the depth of the ring exceeded the width, as shown in Figure 1.

The space between the ring groove and the ring was kept at a minimum and not too much care was given to the finished surface of the ring at point of contact with the groove as shown at points A in Figure 2. As long as the ring was fairly smooth and of uniform thickness, with proper clearances, little else was thought of as far as this feature was concerned.

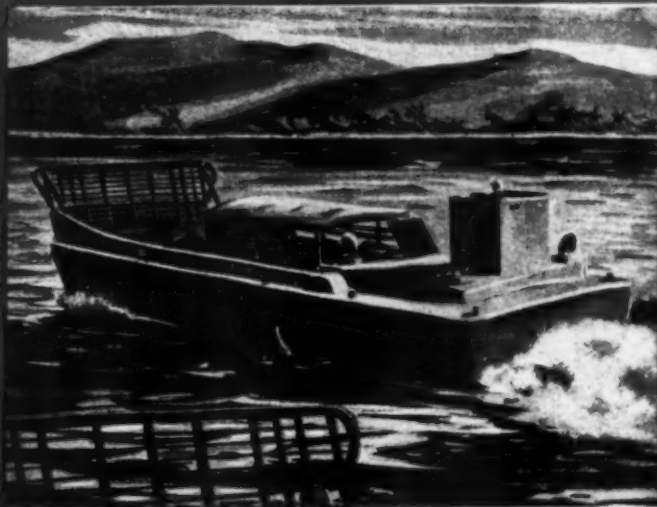
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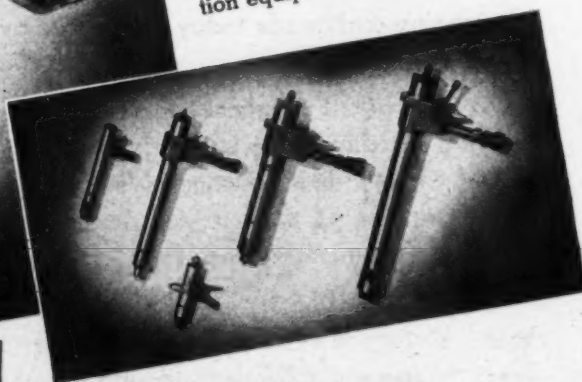
*The Army-Navy "A" is a symbol of war production. Use proudly and the General Motors plant in Detroit.*



## SAFEGUARD DIESEL ENGINE PERFORMANCE with Dependable ADECO FUEL INJECTION EQUIPMENT



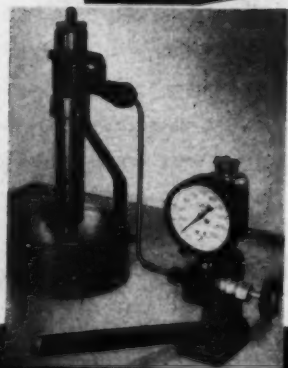
Adeco equipment is engineered to secure the optimum performance of the engine you are building or plan to build. Today's line of fuel injection pumps, nozzles and nozzle holders is the most dependable in Adeco history—the result of years of pioneering and research for the diesel industry. Their performance speaks louder than words in pointing the way to the finest in diesel fuel injection equipment.



### ADECO NOZZLE TESTER for LOW-COST MAINTENANCE

America's most widely used Nozzle Tester enables any mechanic to make quick, accurate tests on injector opening pressure, spray pattern, etc., and detect stuck needle valves and leakage around valve seats. Compact, portable, sturdy, precision-built. Pressures up to 10,000 p.s.i. Tests both large and small injectors. Avoids costly delays and possible damage to engine. Also obtainable with Navy-approved gauge. Write for bulletin.

Ideal for Testing Hydraulic Equipment



## AIRCRAFT & DIESEL EQUIPMENT CORPORATION

4401 RAVENSWOOD AVENUE, CHICAGO 40, ILLINOIS

### Piston Rings—Cont'd from page 76

Experiments have proved that rings of shallower thickness, but increased width, are proving much more satisfactory in some types of units as shown in Figure 2. The cross sectional area of such a ring is as much or even more than that shown in Figure 1. There are of course certain limits which cannot be exceeded. If the ring were made too thin, even though wider, there would be a tendency to break when it is spread to put on the piston. Also it might have a tendency to distort in operation. Therefore that point must be taken into consideration. However the important thing which has been discovered, is the final finish put on the ring. Experimentation has proved that the more polish the ring has at contact with the groove at point B, the better the heat transfer. Also more space has been allowed between the ring and groove at point B and the tolerances increased, for better heat transfer.

Another interesting point which has been disclosed is as follows: When a finished ring is to be installed on a piston, it should not be touched by the bare hand. Moisture given off by the skin contains, salt, acids and other ingredients, which cause quick oxidation, and rust will form on finger prints and spots not touched by the skin, much quicker than on untouched surfaces. Rust being an insulator against heat transfer should therefore, be eliminated. Cotton gloves should be worn when handling and installing highly polished rings.

Another feature which has undergone a change in ring construction, is that of using less hard metal in rings than previously used. By that I mean, that it is much better economy to use a ring which wears faster, consequently must be replaced oftener, than to throw the wear on the more expensive liner surface. Replacing rings oftener is much cheaper than replacing liners. I might also add that many manufacturers are using more modern methods of heat treating their liners, which has a tendency to prolong liner wear at the expense of ring wear. I merely give this illustration, because it may be expanded in the future to ring design on larger units and it seems feasible, that if such ring design will work satisfactorily on small high-speed units, it should also be satisfactory on the larger slow-speed units.





## EXAMPLE OF *Service*:

Adiabatic and Isothermal Compression (page 9) . . . Moisture  
and Dew Point (page 30) . . . Cylinder Clearance (page 10) . . .  
Sludge Formations (page 34) . . . These are just a few of  
the important subjects discussed in our handsome new booklet,  
**AIR COMPRESSOR LUBRICATION.**

Clearly illustrated, packed with helpful information,  
it's free to air compressor owners and their personnel.

Simply write: Cities Service Oil Company,  
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More and more, it's service that counts . . .

and *Cities Service* means good service!



CITIES SERVICE OIL COMPANY  
ARKANSAS FUEL OIL COMPANY



## EX-CELL-O Replaceable Unit Construction Provides Many Advantages



Ex-Cell-O Nozzle and  
Holder Assembly

The Ex-Cell-O Diesel Fuel Injection Pump is an assembly of units consisting of hydraulic, accelerator, control, and transfer pump units mounted on a drive unit arranged for flange mounting on the engine. The proven dependability of Ex-Cell-O Pumps enables this equipment to provide trouble-free operation with a minimum of service attention. However, when servicing is required, the Ex-Cell-O design permits convenient, time-saving, low cost, modern servicing by simply replacing the one unit that requires attention. Specifically:

**Servicing can be done by any mechanic, with ordinary tools.**

**Only the particular unit requiring servicing need be sent to the depot for repairs.**

**The entire pump is out of service only a matter of minutes. Re-calibrating the pump in the field is not necessary, as each unit is properly calibrated before it leaves the factory.**

Ex-Cell-O Fuel Injection Equipment has been thoroughly proven in the severest kind of service, both military and commercial. For complete information concerning Ex-Cell-O Diesel Fuel Injection Equipment, Diesel engine builders should address Diesel Division, Ex-Cell-O Corporation, 1200 Oakman Boulevard, Detroit 6, Michigan.



**EX-CELL-O  
DIESEL FUEL INJECTION  
EQUIPMENT  
EX-CELL-O CORPORATION • DETROIT**

### Superchargers:

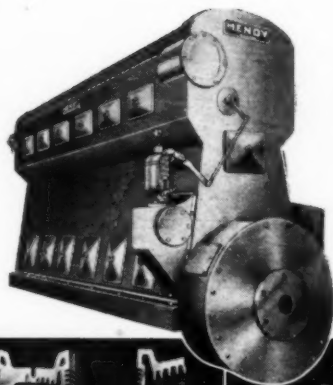
*Continued from page 68*

limits except as higher octane fuels permit operation at higher temperatures. Another factor is strength of the mechanical parts. With constantly improving engine design, materials, and fuels, however, the supercharger will play an increasingly important role, according to Mr. Wasielewski, as manifold pressures rise. In many applications, the decreased cost of carrying around a smaller and lighter engine must be balanced against the cost of supercharging by the means available. Mr. Wasielewski explained also that the positive displacement blowers have other applications connected with reducing weight and size of equipment than supercharging internal combustion engines. For instance, these blowers or compressors are made for use with steam distillation units for obtaining drinking water on remote islands. In connection with aviation, they are used with lifting bags to raise airplanes for servicing and with aircraft heaters for use in the Arctic regions. Mr. J. P. Stewart, Assistant General Manager of B-W Superchargers, Inc., gave many interesting sidelights on trends in engines and superchargers. He noted that the policy of the United States Navy in stimulating Diesel engine development along many lines since the last war has resulted in there being more Diesel horsepower than steam in the Navy today. Internal combustion engines may be expected to continue to develop far beyond the present high state of refinement.

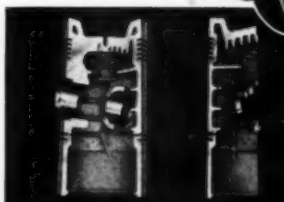
Probably the most spectacular trend in Diesel engines, according to Mr. Stewart, has been the shift from the four-cycle to the two-cycle type in the last decade. He stated that before the war two-cycle engines were rarely built below 1000 horsepower, but that recent statistics released by the Navy show that 75% of all its installed Diesel horsepower is of the two-cycle type, much of it in small engines. Diesel builders are now developing two-cycle engines ranging from 15 h.p. to 2500 h.p., and operating on the whole at higher piston speeds than the four-cycle engines.

Mr. Stewart is certain that this development of two-cycle Diesels makes it necessary for the four-cycle Diesel to be supercharged to obtain the higher mean effective pressure for meeting the competition of the two-cycle engines. Piston speeds must also be increased. Supercharging alone has boosted power of four-cycle engines 30% up to 50%. In one case by a combination of supercharging and increase of rotating speed, a four-cycle engine was raised from 1000 to 1960 h.p. Increases of 75% to 100% above

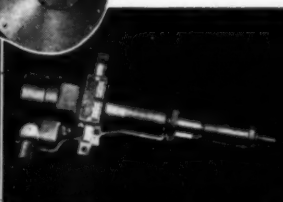




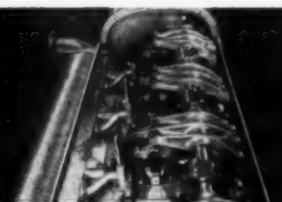
# 22 PROVEN DIESEL FEATURES ONLY HENDY COMBINES THEM ALL



1. Oil-cooled pistons increase piston-ring life.



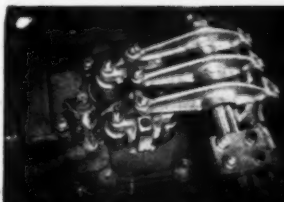
2. Unit fuel injectors eliminate high-pressure lines.



3. Dual valves reduce valve maintenance.



4. Overhead camshaft eliminates push-rod linkages.



5. Hydraulic tappets maintain correct clearances.



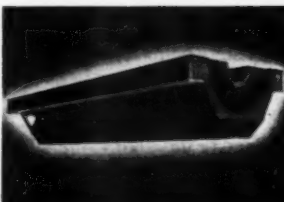
6. Large-diameter crankshaft for reliability.



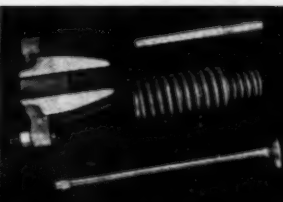
7. Simplified controls aid easy operation.



8. Large bearings in connecting rods reduce maintenance.



9. Welded steel bedplate assures great rigidity.



10. Positive valve mechanism assures smooth action.



11. Front-clutch power take off for auxiliaries.

## OTHER FEATURES not pictured here

- 12. Removable main bearings
- 13. Double rear main bearings
- 14. Jet-action head cooling
- 15. Cage-type relief valves
- 16. Uniform-tension camshaft drive
- 17. Air-operated starting valve
- 18. Large-capacity cooling pumps
- 19. Mechanical or hydraulic governor
- 20. Water-cooled exhaust manifold
- 21. Fresh-water cooling
- 22. Full pressure lubrication

THE important fact about Hendy Diesels is that they combine, for the first time in a single engine, 22 of the most modern design features. Every one of these features was selected by Hendy engineers as a proven and practical development in Diesel design.

Only Hendy Diesels have all twenty-two! Examine the full list above—you are undoubtedly familiar with some—you'll want to know more about the others. Send for data available now on 6 or 8 cylinder Hendy Diesels from 350 to 675 hp, designed for a wide variety of industrial uses or with generators as complete electric plants.

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**SUNNYVALE, CALIFORNIA**

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# NEW *Sheppard* Installation in Strip Mine

Pioneers **NEW** Use  
for Diesel Power



The Dye Coal Company of Cadiz, Ohio, has just installed a Model 6A Sheppard Diesel as the prime generator of power for maintenance equipment. This is a new use for a Diesel . . . and it points the way to improved operation and substantial power economies in similar installations.

The Sheppard Diesel used by the Dye Coal Company is a Model 6A direct-connected . . . by means of a double engagement flexible coupling . . . to an 18.7 KVA—AC 120/240 volt, 1200 R.P.M. generator. This unit is mounted on a steel beam base and is equipped with automatic starting control.

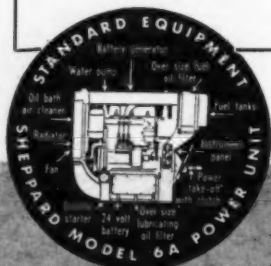
The Dye Coal Company will use this Sheppard Diesel to generate light and provide power for operating drill presses, grinders and other small tools in the field repair shop; for repair and maintenance of power shovels, bulldozers, trucks and other equipment for stripping operations. On priority, Sheppard Diesels are available NOW to essential industries. Sheppard Diesels for post-war use in all industries may be "reserved" through the Sheppard Post-Priority Plan. Before buying any Diesel or a substitute power source, check on the availability of Sheppards.

R. H. SHEPPARD COMPANY, HANOVER, PA.

**Sheppard**  
ALL AMERICAN  
DIESELS

**Free Bulletin  
JUST PUBLISHED  
Shows Sheppard Pump  
Applications**

Sheppard Diesels are standard equipment on the pumps of many nationally known manufacturers. Sheppard also supplies complete pump units. Learn how Sheppard performance is cutting pumping costs . . . increasing pumping speed . . . in diversified industries. Write today for free Sheppard pump bulletin . . . just published.



prewar ratings may therefore be expected to be in order for four-cycle engines.

Mr. Stewart thinks it is doubtful whether the supercharging of passenger automobile engines will come into general use. Balanced against the probable greater supply of high octane fuels and the trend toward smaller and lighter engines are the natural reluctance of the public to accept what may be considered as an extra complication, he feels. Mr. Stewart believes a larger use for superchargers may be found in the engines for private aircraft likely to be built in quantity after the war. Also, that the large field for supercharging in gasoline engines will probably be in the heavy duty or "work horse" engines of 150 h.p. and up. Promising results have been obtained along this line and much further development is in progress, coupled with the trend toward higher octane fuels, according to Mr. Stewart.

He pointed out that there is no universal method of supercharging for covering all requirements. The type of engine and service will dictate the type of supercharging to be used. The turbo-superchargers have so far in this country been used mainly for high altitude aircraft engines and for four-cycle Diesel engines rated between 500 and 2000 h.p. The advantages of this type are in its self-regulating characteristics and its over-all efficiency derived from utilization of the energy in the exhaust gases from the engine. The principal obstacles to the broader use of the turbo-supercharger on small engines have been first cost and problems incident to the high temperature of the exhaust gas. Neither of these objections is unsurmountable, and the next few years may well see a broader use of turbo-superchargers for both gasoline and Diesel engines, according to Mr. Stewart. He explained that the mechanically driven centrifugal superchargers have been used little outside of aircraft engines, but that much progress has been made, however, in improving their efficiency. In his closing remarks, Mr. Stewart said: "The mechanically driven positive displacement blower is used almost universally on two-cycle engines from the smallest to the largest to remove or scavenge the exhaust gases and with higher pressures to super-charge. It is used as a supercharger for four-cycle Diesels rated below 500 hp. At very greatly increased demand for this type of supercharger on four-cycle engines may be anticipated. From the standpoints of simplicity, reliability in operation, and low first cost, it has no superior. With this type of supercharger, the economic requirement of providing additional power at less cost



Precision manufacturing calls for precision service. Here an American Bosch craftsman drills the tiny spray holes in a Diesel fuel pump nozzle. American Bosch service men know this intricate Diesel fuel injection equipment thoroughly.



# Go to these AUTHORIZED AMERICAN BOSCH STATIONS for Expert Diesel Fuel Injection Service

## ALABAMA

Birmingham 3, Birmingham Electric Battery Co., Ave. B & 23rd St. S.

## ARIZONA

Phoenix, Charlie C. Jones Battery & Elec. Co., 318-322 W. Jefferson St.

## CALIFORNIA

Los Angeles 21, Magneto Sales & Service Co., Inc., 751 Towne Ave.  
Sacramento 6, Langner & Rifkin, 1116-22 15th St.

San Francisco 3, Furrer & Ulster, 225 Seventh St.

## COLORADO

Denver 3, Central Supply Company, 1171 Lincoln St.

## FLORIDA

Jacksonville 1, Spencer Electric, Inc., 40 W. Beaver St.

Miami 36, Florida Diesel Service Co., 1930 N. Miami Ave.

West Palm Beach, Sutcliffe's Electric Co., 222 North Olive Ave.

## GEORGIA

Atlanta 3, Auto Electric & Magneto Co., 477 Spring St. N. W.

## IDAHO

Lewiston, Ben Johnson Electric Company, 0114 9th St.

## ILLINOIS

Chicago 16, Illinois Auto Electric Co., 2101 Indiana Ave.

## INDIANA

Indianapolis 4, Gulling Auto Electric Co., 450 N. Capital Ave.

## IOWA

Des Moines 9, Electrical Service & Sales Co., 1313 Walnut St.

## KANSAS

Wichita 2, E. S. Cowie Electric Co., 230 S. Topeka Ave.

## KENTUCKY

Louisville 2, Kentucky Ignition Co., Inc., 737 S. 3rd St.

## LOUISIANA

New Orleans 13, John M. Walton 1009 St. Charles Ave.

## MAINE

Portland 5, Portland Tractor Co., Inc., 803 Forest Ave.

## MARYLAND

Baltimore, Stephen Seth & Co., Inc., 876 Park Ave.

## MASSACHUSETTS

Boston 15, W. J. Connell Company, 121 Brookline Ave.

Boston 10, Wharf Machine & Electric Co., Inc., 265 Northern Ave.

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Detroit, Knorr-Maynard, Inc., 5743 N. Woodward Ave.

## MINNESOTA

Minneapolis 2, Reinhard Bros. Co., Inc., 11 South 9th St.

## MISSOURI

Kansas City 8, Electrical & Magneto Service Co., 2538 Grand Ave.

St. Louis 3, Motor Electric Service Co., 2900 Washington Blvd.

## MONTANA

Billings, Pasley & Spitzer Company, 20 North 33rd St.

## NEBRASKA

Omaha 2, Carl A. Anderson, Inc., 16th & Jones

## NEW JERSEY

Newark 2, Tire Trading Company, Inc., 239 Halsey St.

## NEW YORK

Brooklyn 9, E. A. Wildermuth, 1102 Atlantic Ave.

Buffalo 8, Hettrich Electric Service, 1032 Elliott St.

New York 23, The Durham Co., Inc., 17 West 60th St.

## OHIO

Cleveland 14, The Cleveland Ignition Co., 1301 Superior Ave.

## OKLAHOMA

Oklahoma City 2, American Electric Ignition Co., 725 N. Broadway

Tulsa 3, Electrical & Magneto Company, 917 S. Main St.

Tulsa, Magneto Ignition Company, 701 West 5th St.

## OREGON

Portland 14, Automotive Products, Inc., 1511 Southeast Grand Ave.

## PENNSYLVANIA

Camp Hill, L. B. Smith, Inc.

Philadelphia, Auto Gear & Parts Co., 1410 West Hunting Park Ave.

Pittsburgh 13, Automotive Ignition Co., Inc., 4917-4919 Baum Blvd.

## TENNESSEE

Knoxville 7, R. T. Clapp Company, 401-7 N. Broadway

Memphis 4, Automotive Elec. Service Co., 982 Linden Ave.

## TEXAS

Dallas 1, Beard & Stone Electric Co., Inc., 2101 Bryan St.

Houston 1, Beard & Stone Electric Co., Inc., 805 Polk Ave., P.O. Box 1717

Odessa, Verner Electric Company, 1502 West 2nd St.

## UTAH

Salt Lake City 2, Koepsel & Love, 47 East 7th South St.

## VIRGINIA

Richmond 20, Havens & Martin, Inc., Tilden St., at Broad

## WASHINGTON

Seattle 14, Sunset Electric Company, 300 Westlake North, P.O. Box 3148

Spokane, Sunset Electric Company, 1st & Adams Streets

## WISCONSIN

Milwaukee 2, Wisconsin Magneto Company, 918 N. Broadway

## CANADA

Calgary, Hutton's, 131 11th Ave., W.

Edmonton, Smith Battery & Auto Electric, 10125 105th St.

Montreal, International Electric Co., Ltd., 1037 Bleury St.

Regina, The Electric Motor Service, 1734 Broad St.

Toronto, A. Cross & Co., Ltd., 45 Elm St.

Vancouver, Macfarlane & Co., 1257 Seymour St.

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American Bosch Nozzle Test Stand—typical of the efficient, accurate, factory designed equipment used in the stations listed above.



- Factory trained mechanics
- Most Modern and Up-to-date Methods
- Factory Designed Service Tools and Test Equipment

# AMERICAN BOSCH

DIESEL FUEL INJECTION EQUIPMENT • SPRINGFIELD, MASSACHUSETTS

than by building a larger unsupercharged engine can be met. The future of supercharging will depend on the answer it can give to this economic question. The best internal combustion engine will be the one that produces power at the lowest net cost for unit of work done, be it Kilowatt hour, ton mile, passenger mile, or other yardstick. A combination of factors enter into this problem including first cost, fuel consumption, maintenance cost, and the availability factor. In a truck, for instance, a super-

charged engine may result in reduced first cost due to a shorter and lighter chassis, thereby resulting in additional payloads. In a bulldozer it may mean that extra margin of power required to complete the job on scheduled time against unforeseen obstacles. In a fishing boat, it may mean getting the pack into port ahead of the competitor. In a tug, it may mean that extra maneuverability in emergencies which will save the tow. All of such factors must be considered to get the true perspective.

"The supercharged engine of the future will probably have its largest use in the field of land transportation, including buses and trucks powered by Diesel and gasoline engines and Diesel locomotives and self-propelled cars. Construction and heavy farm machinery should be also fertile fields. The marine field should represent a moderate market for small and medium-sized engines for pleasure and commercial uses. There should be a large demand for engine-generating units from small sizes such as used on farms to the larger power plant units. In short, practically the whole internal combustion engine field may be considered eligible for the benefits to be gained by supercharging."

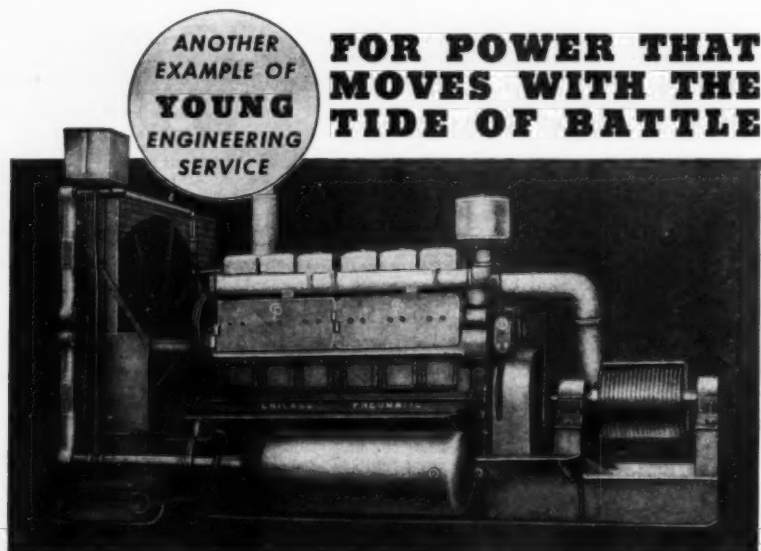


Photo Courtesy, Chicago Pneumatic Tool Co.

● Diesel engines like this, equipped with dependable "Full Flow" Engine Jacket Water Coolers, follow close on the heels of Allied liberation forces, to furnish power for numerous vital war front jobs. Young "Standard" and "Master" Series Coolers are sturdily built . . . have guaranteed capacity ratings . . . are providing efficient engine jacket water cooling for a variety of portable and stationary Diesel power units on battle fronts, in oil fields, in industry . . . wherever power is needed. This is just another example of how proficiently Young engineers can adapt themselves and Young products to specialized war and peacetime heat transfer problems.

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## HEAT TRANSFER ENGINEERS

Manufacturers of Oil Coolers • Gas, Gasoline, Diesel Engine Cooling Radiators • Intercoolers • Heat Exchangers • Engine Jacket Water Coolers • Unit Heaters • Convectors • Condensers • Evaporators • Air Conditioning Units • Heating Coils • Cooling Coils • and a Line of Aircraft Heat Transfer Equipment.

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### Jones Mills, Arkansas Tops Brawley, California

WE were wrong in stating in the caption for the October DIESEL PROGRESS front cover illustration that the Brawley, California plant of the Imperial Irrigation District is the largest Diesel plant in the United States. As compared with the total of 18,340 hp. at Brawley, the Jones Mills, Arkansas plant of the Aluminum Company of America has 18 Nordberg gas-burning Diesels of 3600 hp. each—a total of 64,800 hp. Since these big Nordbergs operate on the Diesel cycle the honors clearly go to the Jones Mills, Arkansas plant where—by the way—there are also 50 Cooper-Bessemer gas engines of 1000 hp. each.

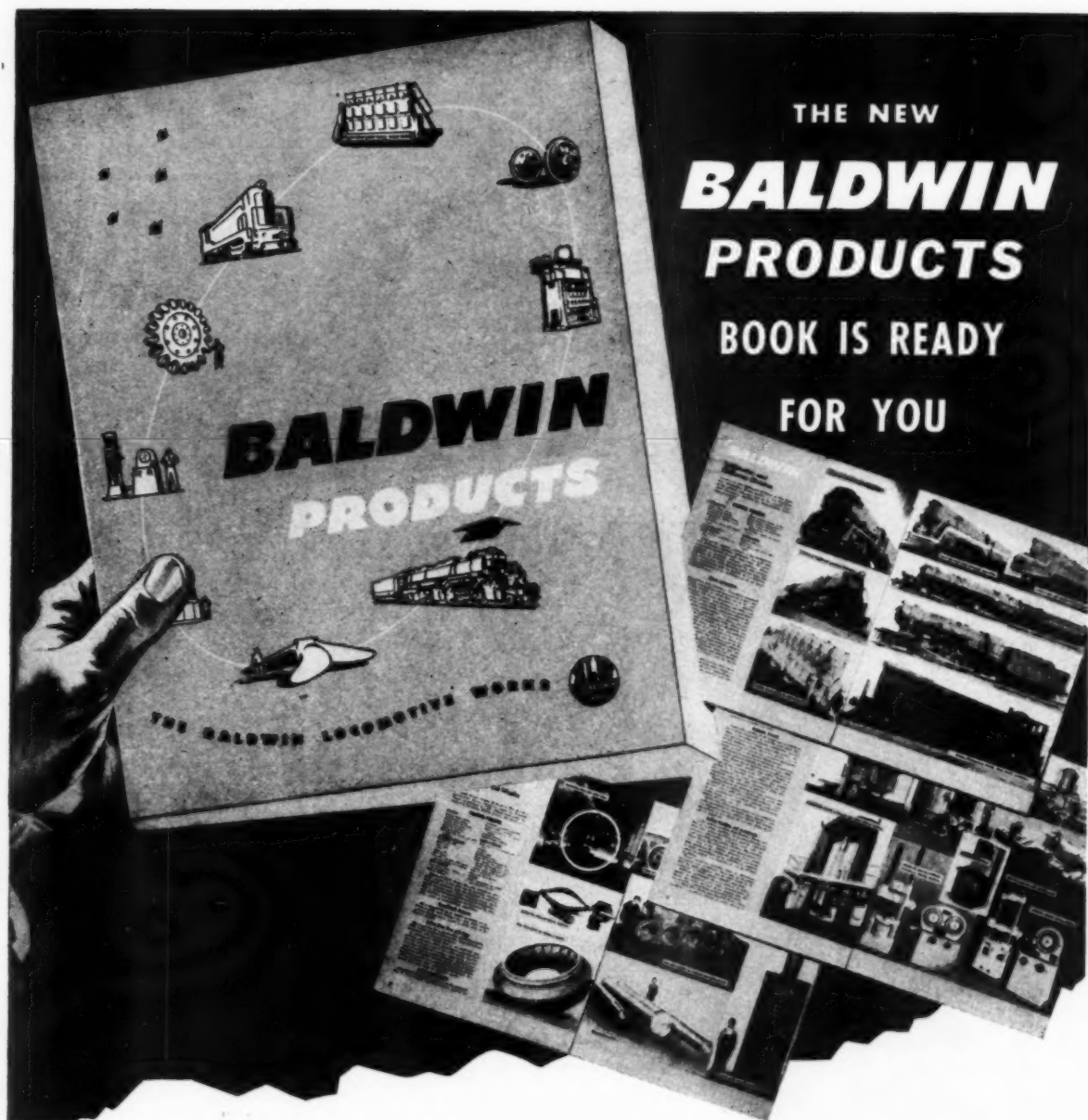
### Titeflex, Inc. Receives Second Army-Navy Award

FOR a second time the Army and Navy have awarded to Titeflex, Inc. of Newark the Army-Navy "E" award for excellence in war production. A white star will now be added to the "E" pennant which flies from the flagstaffs of the company plants. The award was recently announced to the employees in a letter from Under Secretary of War Patterson.

A majority of American warplanes fly equipped with radio shielded ignition harnesses manufactured by Titeflex. This equipment physically protects the plane's ignition system from the elements, but—more important—completely dampens electrical noise from the ignition system so that aircraft radio and electronic devices may operate.

While its War Production record has been outstanding, Titeflex looks forward to the Post-war period with confidence that it can continue to do a large volume of business. This will be made possible through improved manufacturing





There is hardly an industrial field that does not use one or more of the many products listed and pictured on the pages of this new Baldwin bulletin. Between its covers you may find ways that Baldwin can help you with your immediate production problems or with your post-war plans.

A handy index of all the major products of The Baldwin Group, arranged in accordance with their applications in particular industries, will enable you to see at a glance where Baldwin can be of service. A request for Bulletin 211, on your regular letterhead, will bring this book to your desk without obligation on your part.

The Baldwin Locomotive Works, Philadelphia, Pa., U. S. A. Offices: Philadelphia, New York, Chicago, Washington, Boston, Cleveland, St. Louis, San Francisco, Detroit, Houston.



# **BALDWIN**

The Baldwin Locomotive Works, Philadelphia, Pennsylvania: Locomotive & Ordnance Division; Baldwin Southwark Division; Cramp Brass and Iron Foundries Division; Standard Steel Works Division; The Whitcomb Locomotive Co.; The Pelton Water Wheel Co.; The Midvale Co.

techniques and additions of new products to its present line.

Part of this enviable production record must be credited to the harmonious cooperation existing at Titeflex between Management and Labor. Labor in Titeflex plants is represented by Local 260, U.A.W.A., C.I.O., and during the entire war emergency there has never been a work stoppage in any department of any Titeflex plant. Such a record reflects credit

upon both the Industrial Relations policies of the management and the cooperative spirit of the local union.

#### Installation and Service Manual Available to Users of Pullmore Clutches

A MANUAL illustrating and describing each step in the installation and servicing of Pullmore Clutches has been made available to users by Rockford Drilling Machine Division

of Borg-Warner Corporation. The company also announces publication of two new engineering bulletins on Pullmore multiple disc clutches and Pullmore combination multiple disc and jaw drive clutches. Those interested may secure copies of these bulletins by addressing the company at Rockford, Illinois.

#### Penn Establishes Dallas Branch

ANTICIPATING increased activity in the Southwest, Penn Electric Switch Co. has opened a branch sales office in Dallas, Texas, located in the Wilson Building.



Ray P. Waite

The Dallas branch office will be managed by Ray P. Waite, a graduate mechanical engineer who also has had considerable experience in electrical and chemical engineering. Mr. Waite was in the public utility business until 1932 at which time he was Vice President and General Manager of a mid-west utility company. Since 1932, he was engaged in consulting engineering and in this capacity has done sales, sales promotion and product research work. Mr. Waite's experience also embraced oil production and refinery design and construction in addition to design, construction and operation of chemical plants, industrial plants and commercial buildings.

#### Pedrick Training China Air Force Engineers

THREE captains of the China Air Force have been in training for nearly a year at the factories of Wilkening Manufacturing Co., makers of Pedrick piston rings. These three officers of our sister Republic are learning the special

# ENGINEERING ARROW

THE

**THE CLUB**  
**THE AXE**  
**THE ARROW**

... each was an important step upward on the ladder of the ages. Each embodied the elimination of weight and gave more power and greater range to the hand of man. Each required the highest engineering and production skill of its day. Today the Guiberson Diesel, backed by more than 25 years of precision production of oil tools and more than 15 years of engineering and production of diesel engines, is the fleet arrow of tomorrow's transportation on sea, on land and in the air. It is the light weight power plant that is safer, more economical and more efficient.

**PRODUCERS OF OIL TOOLS,  
OIL HEATING UNITS,  
AIRCRAFT PARTS AND  
DIESELS**

**Guiberson**  
**U.S.A.**  
**GUIBERSON DIESEL ENGINE CO.  
THE GUIBERSON CORPORATION**

**Dallas,  
Texas**





## PUROLATOR PROTECTS

### THE DUKE FROM GRIT AND GRIME

The "Duke" was originally built in 1888, but she was rebuilt in 1943. Everything about her, except the hull is as new and modern as her Purolator fuel and lube filters. Those filters are especially important to the six-cylinder Atlas-Imperial Diesel which powers the "Duke." Should grit and grime clog the tiny fuel injection apertures the "Duke" would fail to function.

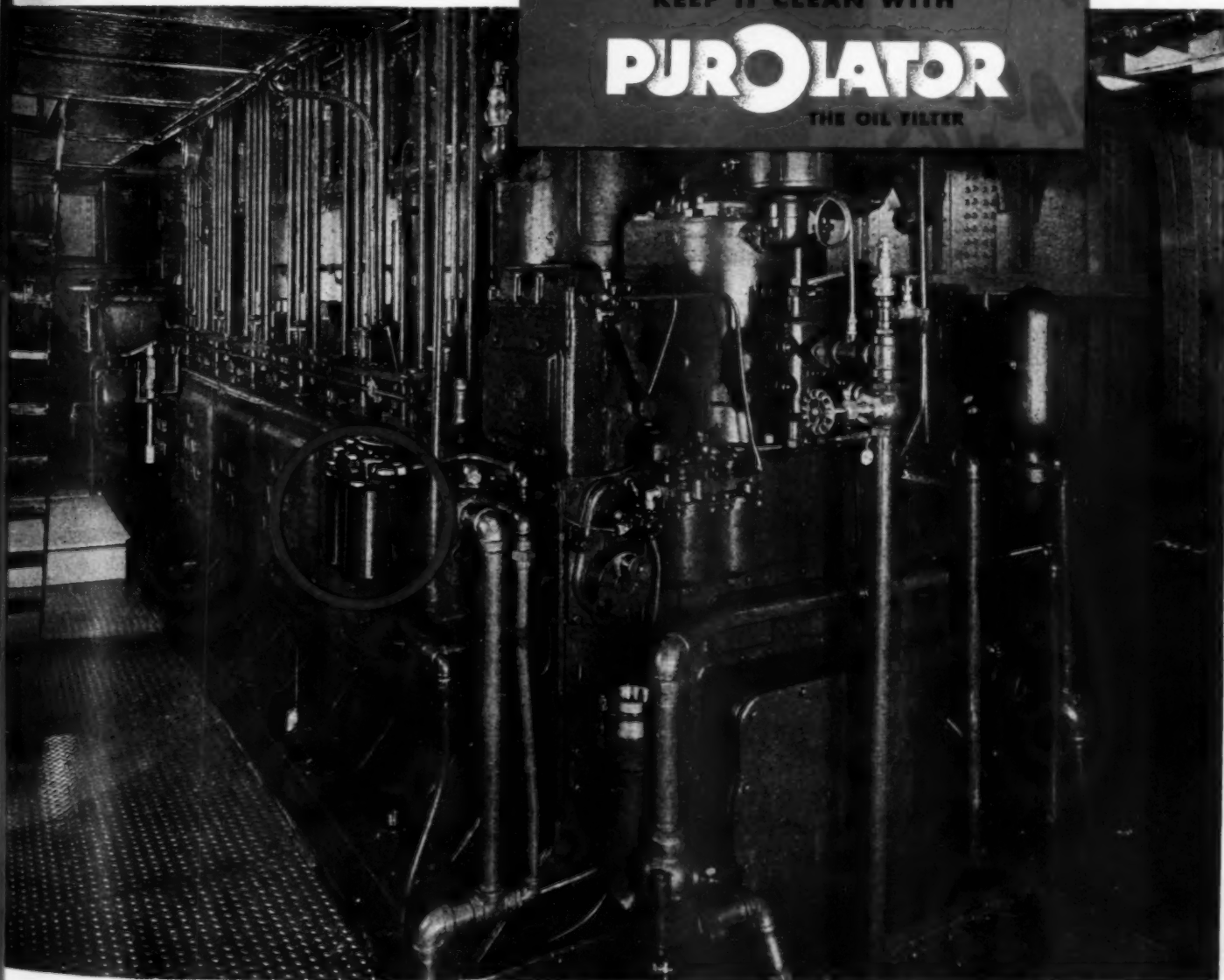
In other Diesel installations everywhere, on sea as well as land—on ships, trucks, tractors, stationary engines—power is maintained at full efficiency wherever Purolator filters are on the job. Lube oil Purolators protect the lubrication system. Fuel oil Purolators protect the fuel injection system. Purolator Products, Inc., founder and leader of the oil filter industry, Newark 5, New Jersey.

*With a complete line of filters for both lubricating and fuel oils, Purolator saves money and worry for thousands of Diesel operators. Constant development work assures the adaptability of the Purolator line to both old and new engine designs, on both land and sea.*

**Buy More War Bonds and Stamps—NOW!**

KEEP IT CLEAN WITH

**PUROLATOR**  
THE OIL FILTER



ized business of making piston rings for aircraft engines. They are learning from the ground up . . . metallurgy, sand analysis, foundry procedures, machinery and other factory operations, inspections and tests.

The three engineers, chosen from among many in China for this special work, are Kuang-Chia Hu, Veng-Song Doo and Sze-Min Hu. For ease on the memory and tongue, their fellow workers at Wilkening call them Jack, Vince and Sam, respectively.

Arrangements for the training of the China Air Force engineers by Pedrick was made between F. W. Wilkening, president of the company and Colonel Lyn Chu, representing the Commission on Aeronautical Affairs for the Republic of China. Very soon, it is expected that other Chinese students will arrive to join their compatriots and to take supplementary training and practice so China will be sure of a complete team of piston-ring experts to help her direct this part of her plans for postwar industrialization.

## National Supply Opens St. Louis Office

THE Superior Engine Division of The National Supply has announced the opening of its St. Louis office at 1405 Boatmen's Bank Building and the appointment of E. F. Haberkern as District Manager.



E. F. Haberkern

Mr. Haberkern attended the University of Notre Dame, graduating in Mechanical Engineering. He has been employed for many years in the Springfield plant of the Superior Engine Division, in the shop and in the Sales Production and Service Department of the office.

## Donald H. Teetor Elected Vice President in Charge of Sales of the Perfect Circle Company

THE election of Donald Teetor as Vice President in Charge of Sales has just been announced by Lothair Teetor, President of The Perfect Circle Company.

Donald Teetor has been Sales Manager of the Replacement Division of the corporation for several years. This summer he was made General Sales Manager and at the Board of Directors meeting held September 26 became one of the corporation's three Vice Presidents. Ralph Teetor is Vice President in Charge of Engineering and Daniel C. Teetor is Vice President in Charge of Manufacturing.

At the time Donald Teetor became General Sales Manager, J. C. Hamilton was made Sales Manager of the Replacement Division and R. M. Thomas, formerly Manager of the corporation's Toronto plant, was made Sales Manager of the Manufacturer's Division.



# LATEST NEWS ON HYDRAULIC COUPLINGS





BULLETIN No. 136  
TWIN DISC CLUTCH COMPANY - HYDRAULIC DIVISION - ROCKFORD, ILLINOIS

In all types of equipment driven by internal combustion engines, there is a definite trend toward hydraulic couplings as the connecting link to assure increased wear-life and better performance. Owners, operators, and engineers agree that shock loads are often responsible for a large part of the maintenance cost of a driven unit, and that this cost can be sharply reduced through the use of hydraulic couplings. In addition, an hydraulic coupling will give the machine added flexibility . . . a smoother work cycle.

Twin Disc Hydraulic Couplings and Twin Disc Hydraulic Power Take-offs include so many refinements that we have put the whole story into a new brochure which is just off the press. Your request for Bulletin 136 will bring this information to you by return mail. Write TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).



Reduction Gear



**TWIN DISC**  
CLUTCHES AND HYDRAULIC DRIVES  
REG. U.S. PAT. OFF.



Power Take-off



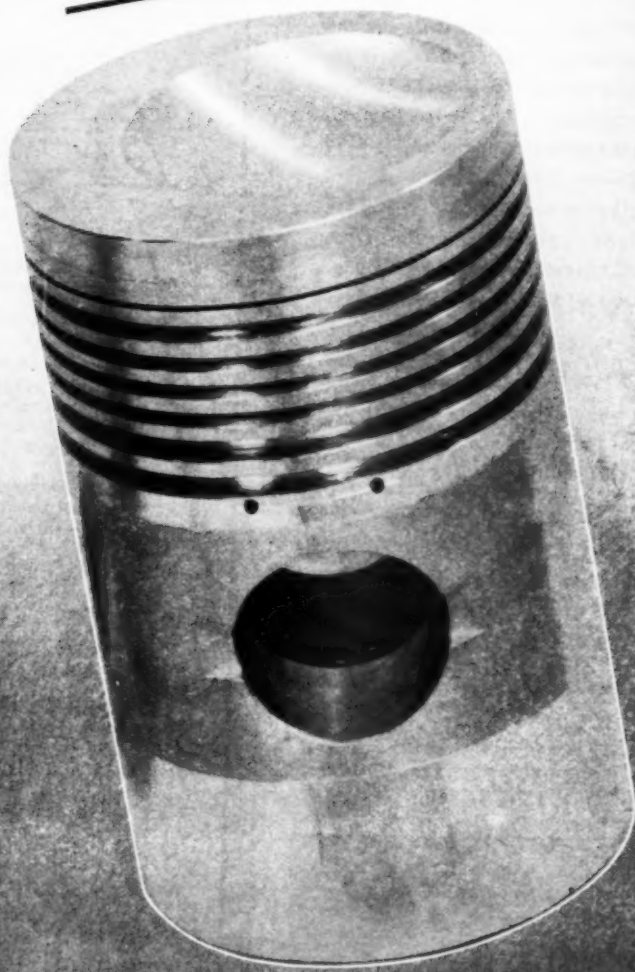
Marine Gear

SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918



of The Na  
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E. F. Haber

# Product of ALCOA aluminum PISTONS



**ALCOA**



**ALUMINUM**

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## DEMA Educational Committee Meets

**M**ANUFACTURERS of Diesel engines, meeting in Chicago with 23 deans and professors from some of the nation's top-flight engineering schools, heard them describe their pressing need of better facilities for turning out competent Diesel operators—and pledged them support.

The occasion was the luncheon get-together of the educational committee of the Diesel Engine Manufacturers Association, with the engineering instructors, at LaSalle Hotel October 7. It was estimated that the latter, some of whom had travelled 1,000 miles to be present, represented one-third of all the nation's engineering students.

Gordon Lefebvre, president of Cooper-Bessemer Corp. and chairman of DEMA's committee, listened to pleas for modern, smaller type engines, of from 100 horsepower down, for students to dismantle and study. Mr. Lefebvre told the educators that DEMA already had done considerable preliminary work toward procuring these engines for them, from government wartime surpluses.

Mutual benefit to school and manufacturer from students and even professors spending considerable of their time working in Diesel engine factories was another topic the educators discussed. Others were the amount of Diesel specialization their mechanical engineering courses should include, facilities for doing research work, desirability of manufacturers establishing fellowships, and the nature of post-graduate work. Prof. Robert B. Rice, whose work in Diesel engine instruction at North Carolina State college is outstanding, has been engaged by DEMA as educational consultant. Addressing the instructors present as "the backbone of engineering in the United States," he said it was "astounding how few engineering schools, essaying to give Diesel engineering instruction, had adequate equipment."

In passing the Surplus Property Act of 1944, Prof. Rice added, Congress felt it was actually "giving nothing away—the benefits to be derived by the states will be adequate payment for whatever monetary loss may be sustained in the dispositions of the surplus property board."

Standing, left to right—Harvey T. Hill, exec. director DEMA; Paul J. Every, Baldwin Locomotive Works; John W. Anderson, American Locomotive Co.; Prof. Robert B. Rice, educational consultant DEMA; Henry J. Barbour, Fairbanks, Morse & Co.; Walter A. Parrish and J. A. Spalding, National Supply Co.; D. C. Peterson and M. C. Wright, Atlas Imperial Diesel Engine Co.; Roland W. Bayerlein, Nordberg Mfg. Co.; Rex W. Wadman (guest) editor and publisher DIESEL PROGRESS, and Roy A. Hundley, Enterprise Engine & Foundry Co. Seated, left to right—Louis R. Ford (guest), editor Motorship; S. S. Sample, Busch-Sulzer Bros.-Diesel Engine Co.; Gordon Lefebvre, committee chairman, Cooper-Bessemer Corp.; George Mueller, General Machinery Corp.; W. E. Wechter, Worthington Pump & Machinery Corp., and George J. Rathbun, Rathbun-Jones Engineering Co.



## The DONALDSON Oil-Washed AIR CLEANER HAS NO RIVAL IN EASE of MAINTENANCE



Any cleaner is only as effective as its maintenance. The Donaldson Air Cleaner is easier to service and therefore is serviced as it should be. Just one simple operation is all that's required. At regular intervals depending on dust conditions... remove oil cup, empty, refill, and replace! No cleaning of the element necessary... no trouble with clogged filters because there are none.

A Donaldson engineered installation means the air cleaner is instantly and easily accessible, encouraging the operator to stick to a servicing schedule.

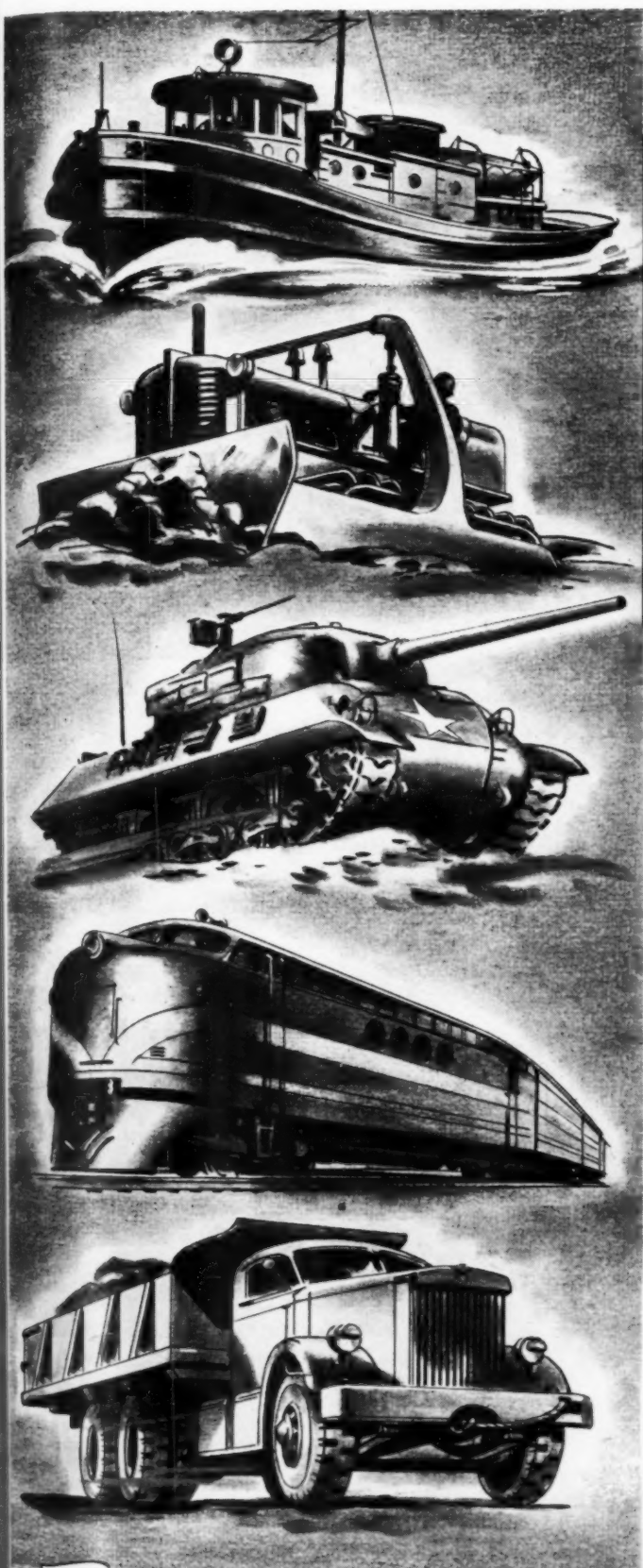
**DONALDSON COMPANY, Inc.**  
666 PELHAM BLVD. SAINT PAUL 4, MINNESOTA

Air Cleaner  
Engineering Service

Available to You.  
Write Us.

## DONALDSON Oil-Washed AIR CLEANERS





*The big fellows have*  
**DELCO-REMY**  
**DIESEL**  
**Electrical Equipment**

Diesel power does the heavy work—spinning the propellers of busy harbor tugs . . . pushing powerful earth-moving bulldozers . . . turning the treads of cannon-carrying tanks . . . whirling the wheels of streamlined trains and electric generators . . . driving massive, off-the-highway cargo trucks. Diesel power and Delco-Remy Diesel electrical equipment are in there punching.

The severe demands of each type of service call for the utmost in rugged, dependable electrical equipment. Delco-Remy, working in close cooperation with Diesel engine builders, and using the extensive experience gained in serving the electrical needs of the automotive industry, has developed Delco-Remy cranking motors, generators, regulators and switches to handle heavy Diesel assignments—and handle them well.

Delco-Remy is keeping pace in the swift progress of Diesel developments. Delco-Remy is well qualified to meet the war-time and peacetime requirements of the Diesel industry.



*Service on Delco-Remy equipment is available in the United States through authorized service stations of United Motors Service.*

**Dollars Fight Too!**  
**Buy More War Bonds**

**Delco-Remy**  
DIVISION, GENERAL MOTORS CORPORATION  
 ANDERSON, INDIANA



**BUILDER OF AUTOMOTIVE, AVIATION, TRACTOR AND MARINE ELECTRICAL EQUIPMENT**

### Ohio Crankshaft Appoints Minnesota Distributor

APPOINTMENT of The Anderson Machine Tool Company, 2645 University Avenue, St. Paul 4, Minnesota, as a special distributor of TOCCO Process Induction equipment, is announced by Wm. C. Dunn, President of The Ohio Crankshaft Company. The Anderson Company will serve the Wisconsin-Minnesota area. It is the tenth machine tool distributor to be given a TOCCO sales contract.

### Lovejoy Heads DeBothezat's Kansas City Sales District

FREDERICK K. LOVEJOY has been appointed manager of its Kansas City district sales territory according to an announcement issued by American Machine and Metals, Inc., East Moline, Illinois. For 14 years, Mr. Lovejoy was associated with the Consolidated Laundries Corporation of New York City in executive positions in various divisions of that company. Prior to that he was with the Indiana

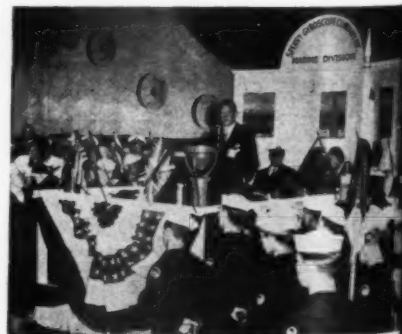
Flooring Company and later with York Sales & Lock Company. Mr. Lovejoy is a graduate engineer of Cornell University where he was a star athlete.



Frederick K. Lovejoy

Headquarters of the Kansas City district office of American Machine and Metals, Inc., of which Mr. Lovejoy is manager, are located in the Midland Building of that city. The divisions of the company under his supervision include Troy Laundry Machinery, DeBothezat Fan Riehle Testing Machines and Tolhurst Centrifugals.

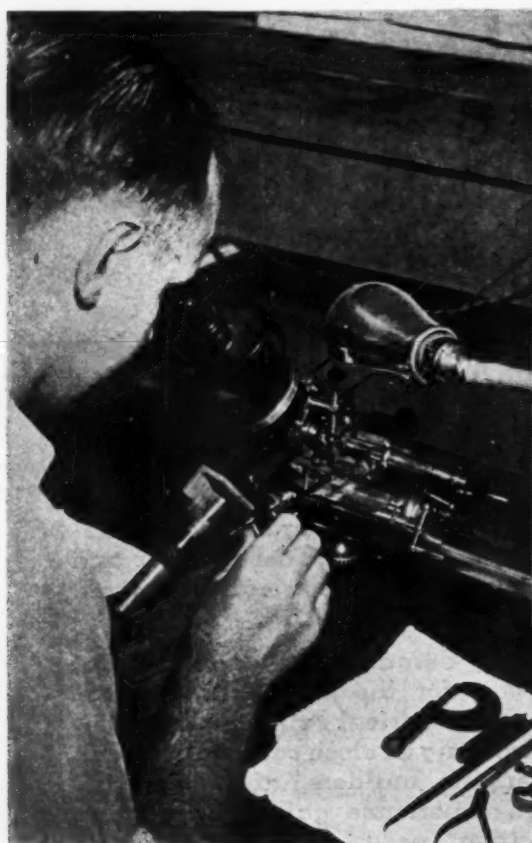
### Sperry Awarded Maritime "M"



R. E. Gillmor, (at microphone) president of the Sperry Gyroscope Company, congratulates employees of the Sperry Marine Division on winning the Maritime "M" and Victory Fleet Flag. The award was made by Rear Admiral H. L. Vickery (seated to left of Gillmor) vice chairman, U. S. Maritime Commission, in recognition of Sperry's outstanding record in producing Gyro-Compasses and other precision instruments for the Merchant Marine.

### Enterprise Sales Manager Returns from Mexico Trip

E. B. SCOTT, sales manager, Enterprise Engine & Foundry Company recently returned from an extended business trip to the Gulf of



*The*  
**DIESEL ENGINE**  
*is founded on  
the precision,  
microscopic  
hole*

No doubt about it—all of the advanced metallurgy, expert engineering and high-grade materials entering into the design and construction of the modern Diesel cannot produce the ultimate attainable efficiency of the Diesel cycle without the microscopic, precision-drilled holes in fuel injection nozzles. Give your Diesel designers and builders the best obtainable tools for this vital and intricate operation. We can supply the precision drills and super sensitive drilling machines which will insure optimum combustion conditions or we can drill your nozzles precisely to your specifications. Let Us Show You What We Have Done.

*"The Only Business Of This Kind In The World"*

# National Jet Company

115 MILTON PLACE

CUMBERLAND

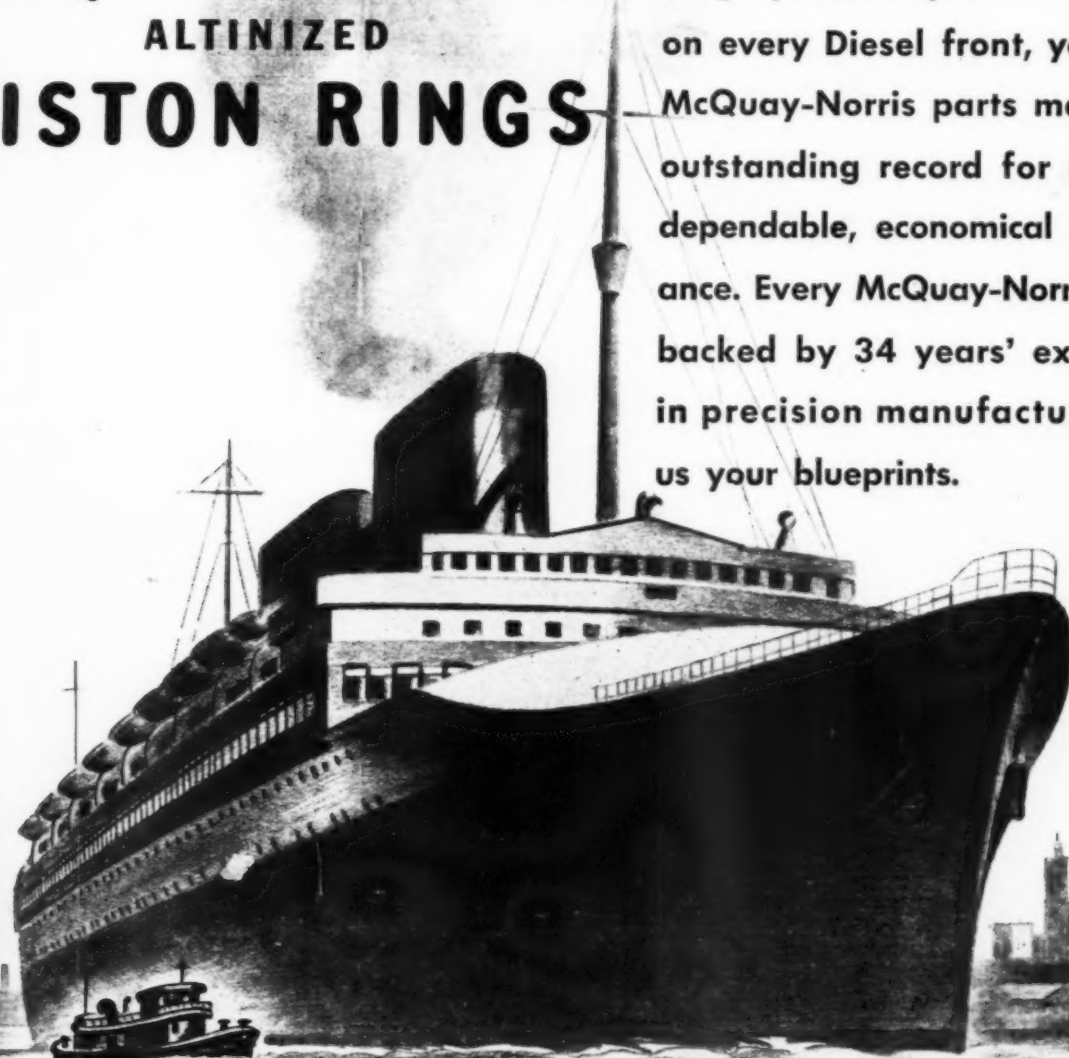
MARYLAND



# Parts built for Toil and Sweat

## McQUAY-NORRIS ALUMINIZED PISTON RINGS

Diesel engines have tough work to do... and tough work demands tough precision parts. That's why, on every Diesel front, you'll find McQuay-Norris parts making an outstanding record for efficient, dependable, economical performance. Every McQuay-Norris part is backed by 34 years' experience in precision manufacture. Send us your blueprints.



Awarded to two plants  
McQuay-Norris Ord.  
Management Division

# McQUAY-NORRIS

## MANUFACTURING COMPANY

ST. LOUIS, MO.



PRECISION WORKERS IN IRON, STEEL, ALUMINUM, BRONZE, MAGNESIUM

Mexico, Monterrey and Mexico City. While in Mexico City, Scott attended the ceremonies of the opening of the Ixtapantongo Hydro-electric plant, designed and built by Mexican engineers under the direction of Commission Federal de Electricidad of the Mexico Government. This 32,000 KW plant took seven years to construct and was christened with elaborate ceremonies on August 29 with government officials including President Comacho in attendance. An Enterprise Diesel Engine is installed

at the plant providing stand-by power and occupies the lower floor of the power plant.

The Ixtapantongo plant is the first of several planned hydro-electric projects that will be built in the next four or five years, according to Carlos Ramirez Ulloa, Executive Chief of the Commission Federal de Electricidad.

According to Scott, this hydro-electric development of the Mexican government clearly

indicates the forward steps that are being undertaken. Scott says, "there is a growing requirement throughout Mexico for Diesel and natural gas engines of 200 HP and over for use in Diesel electric plants, pumping operations, mines, flour mills, sugar refineries, dredging and other industrial development."

Continuing Scott adds, "Mexico's natural resources are abundant. Its mines have produced fabulous wealth, its grazing lands fine cattle and horses, its sisal hemp is preferred by America, its guayule shrub goes into the making of tires, Mexico's long cotton staple and her petroleum are making news headlines. Mexico is progressive and its people are minded to develop their resources into producing industries and I predict great prosperity in the country of our south of the border neighbor."

#### **Mallison Heads Mack Bus Sales in Southern Division**

**A**PPPOINTMENT of H. D. Mallison as manager of Mack bus sales in the southern division with headquarters at Atlanta, Ga., has been announced by R. A. Hauer, vice-president in charge of bus sales for the Mack-International Motor Truck Corp.



H. D. Mallison

Mallison joined the Mack organization September 1st after 20 years with the sales forces of the National Pneumatic Co., Philadelphia. Known as "Doug" Mallison in the bus industry, he was born in Montreal April 14, 1898. While attending Lower Canada College in 1915 he enlisted in the Canadian Grenadier Guards, serving in France and Belgium and with the Army during the Occupation. After the war, he attended the

**DIESEL**  
*Bolting*  
**SPECIALISTS**  
PRECISION  
ERIE BOLT & NUT CO.  
ERIE, PA.



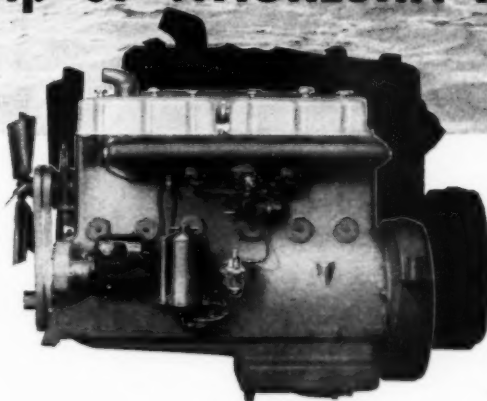


# The U.S.S. OKLAHOMA **“COMES BACK”** with the help of **WAUKESHA POWER....**

■ Powered by Waukesha Engines, two of a battery of big Ingersoll-Rand K-500 portable air compressors... mounted on the barge at the right... are shown helping to raise the *U.S.S. Oklahoma* after the Japanese raid on Pearl Harbor.

A battleship of some 29,000 tons, the *Oklahoma* had completely capsized before sinking. Lying in shallow water—bottom up—she had to be righted as well as floated.

To raise her, compressed air in large volumes was used—to force water in flooded compartments down and out through valves fitted to bottom plating—or, to lower water by expelling it through holes in the hull, closing holes with emergency patches and then unwatering the compartments.



Here was another place where Waukesha wartime engines could *and did* help the Navy to speed up its tremendous task of salvaging.

Seventeen months after Pearl Harbor 16 of the 19 ships that had been sunk

and damaged were salvaged and back in active service with our Navy.

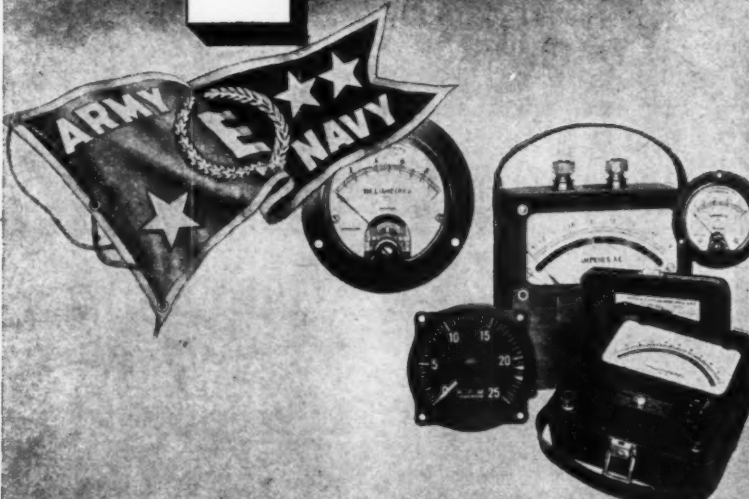
When time counts... and it did here more than it ever had before... you can push Waukesha-powered equipment far, fast and furious—all around the clock *again and again* until the job is done. That's dependability! Waukesha wartime engines have it. The new Waukesha peacetime engines will have it, too. Consult Waukesha about your future engine needs.

## WAUKESHA ENGINES



WAUKESHA MOTOR COMPANY, WAUKESHA, WIS. • NEW YORK • TULSA • LOS ANGELES

**4<sup>th</sup> CITATION**  
*for continuing  
 leadership in war  
 instrument production*



This succession of citations and stars awarded to WESTON is recognition of WESTON'S unremitting war effort . . . and their record in supplying instruments to the exacting standards essential for the most vital assignments of our armed forces.

That WESTON has been first in this highly specialized instrument field to receive each of these successive honors is the inevitable consequence of a leadership acknowledged throughout the years by governments and industry alike. Weston Electrical Instrument Corporation, 579 Frelinghuysen Avenue, Newark 4, New Jersey.

**Weston**

*For Over 56 Years Leaders In Electrical Measuring Instruments*

School of Engineering at McGill University. He worked for three years with the Montreal Tramways, Maintenance and Way Department and on January 1, 1924 joined the National Pneumatic Co. During his long service with that firm he has gained a wide circle of acquaintances in the bus industry.

**Worthington Names C. W. Camp Consulting Electrical Engineer**

**W**ORTHINGTON Pump and Machinery Corporation, Harrison, N. J., announces that C. W. Camp, formerly with Crocker-Wheeler Electric Manufacturing Company for 38 years, specializing in application engineering, is now associated with Worthington as Consulting Electrical Engineer.



C. W. Camp

A former executive member of the National Association of Electrical Manufacturers, Mr. Camp brings a wide background of experience in the electrical industry to his new work with Worthington's Public Utilities Department. Mr. Camp, who replaces the late Harry Wood, will assist in solving electrical application problems for all Worthington sales divisions and district offices. His services will also be utilized by the company's manufacturing departments.

**Briggs Introduces New Line of By-Pass Type Clarifiers**

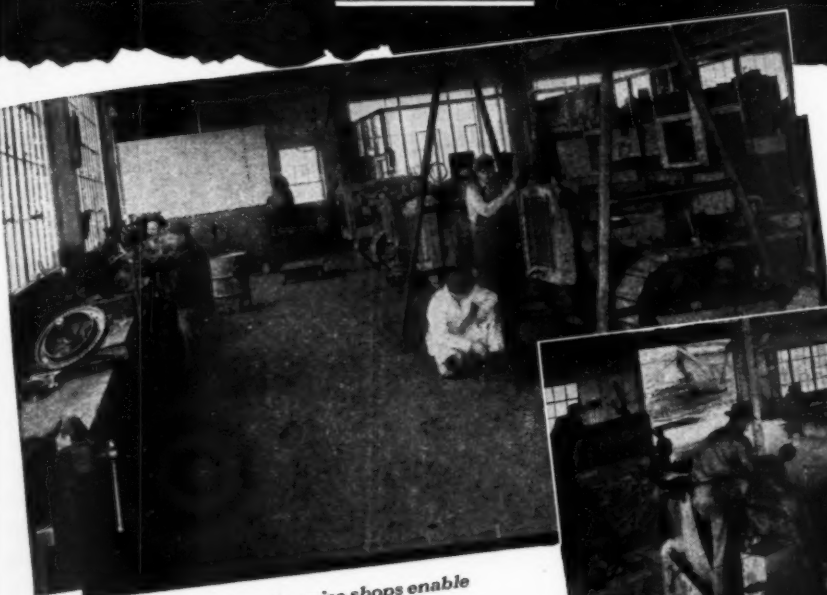
**T**HE Briggs line of oil clarifiers employing the Briggs Patented Fullers Earth Block and Briggs specially-developed all-cellulose refill cartridges has been further expanded by the introduction of the new DR Series lubricating oil clarifiers.

The standard DR Series Clarifiers have been designed to meet industry's need for an efficient, reliable line of oil filters for by-pass

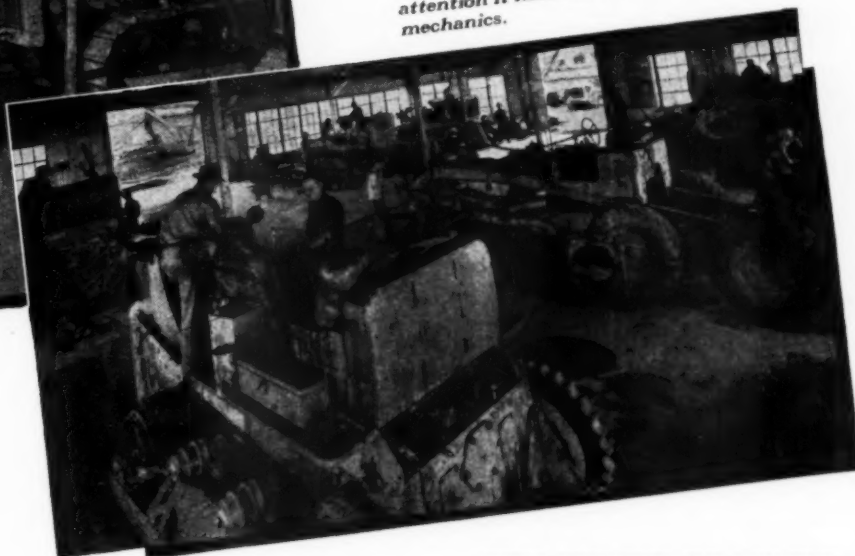
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# Their business is to help keep your business going



• Big, well-equipped service shops enable "Caterpillar" dealers to offer their customers the last word in maintenance and repair service.



• In this dealer's repair shop, every kind of "Caterpillar" equipment receives the attention it needs in the hands of skilled mechanics.

"CATERPILLAR" owners are fortunate in having a dependable service-dealer organization to which they can turn for expert inspection, adjustments and repair work at a time when obtaining new equipment is virtually out of the question—except for the most essential needs.

That your "Caterpillar" dealer is able to provide such services, despite the fact that his showrooms may be empty, is due to sensible long-range planning. His dealership has been established on the sound principle that doing business successfully is not alone a matter of making sales, but of *keeping sold equipment in good operating condition.*

During the long war years, your "Caterpillar" dealer has been steadily on the job—geared to come through for you. In fact, his shop is

likely better equipped to serve you than ever before, with more factory-trained service men, finer equipment and the latest methods to save time, money and war-critical materials in keeping your machines at work. His desire is to make your business more profitable.

Have your "Caterpillar" service-dealer go over your equipment *now*—for inspection, adjustments, and replacement or repair of worn parts. In this way, not only can your operating costs be kept at a minimum, but the life of the equipment can, most likely, be prolonged by thousands of hours.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS, U. S. A.

## THE "FIGHTING FOUR"

**INSPECT** Look your equipment over frequently. For expert "internal" inspection of operating parts or functions, call in a trained "Caterpillar" service man. Read your Operator's Instruction Book.

**LUBRICATE** Use the right oil at the right time in the right place and in the right quantity. Keep the oil clean—change before it becomes dirty and deteriorated. Follow the Operator's Instruction Book.

**ADJUST** Tighten all bolts. Keep fan belt and tracks at proper tension. Read the Operator's Instruction Book. For fuel injection valves and other precision adjustments, let your experienced service-dealer do the work. He'll do it well.

**REPLACE** Have your service-dealer replace or repair worn bearings, track rollers, pins and bushings, sprockets, cylinder liners, clutch linings. His service helps restore power and extend equipment life. Saves critical materials, too.

**DO YOU HAVE IDLE EQUIPMENT?** The War Production Board wants to locate usable track-type tractors, motor graders, cranes, shovels—vitaly needed by mining, logging, oil-field, agriculture and other industries. What can you spare—to rent or sell? If you don't know where to contact your regional WPB officials, your "Caterpillar" dealer will gladly direct you and give you further details.

# CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

TRACTORS • ENGINES AND ELECTRIC SETS • EARTHMOVING MACHINERY

stallation. Each unit is equipped with a precision-built relief valve set to maintain the most efficient operating pressure inside the clarifier and to allow circulation through the clarifier when the oil is cold. Flow capacities range from 1 to 20 gpm.

The smaller models in the DR Series are designed for a maximum working pressure of 100 psi. and a hydrostatic test pressure of 150 psi. for use with smaller size internal combustion

engines requiring shunt type installations. For larger size engines where by-pass installation is preferred, there are DR models with working pressures of 40 psi. and hydrostatic test pressures of 60 psi.

All standard D-size refill cartridges are interchangeable in the DR Series Clarifiers. The center tube of the refill assembly has been enlarged so that the refill will be properly centered on the pressure plates to assure uniform pres-

sure over the entire end of the refill—positive assurance against by-passing.

### Diesels Ordered For Wide Range of Uses

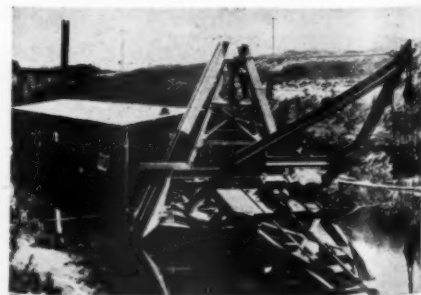
**L. J. VACCARO** of the Standard Fruit & Steamship Company, New Orleans has just placed an order for an Enterprise turbocharged Diesel engine, rated 500 hp. at 350 rpm. for the main propulsion power for a tugboat now being reconditioned from a design by R. Rodriguez, Naval Architect, located on the Industrial Canal, New Orleans. The new vessel will operate as a cargo and banana boat between Central America and New Orleans as part of the large fleet operated by the Vaccaro interests in those waters.

**LEVINGSTON** Shipbuilding Company is equipping a new 80 foot tug now under construction by the company at Orange, Texas with an Enterprise turbocharged Diesel engine rated 550 hp. at 350 rpm.

**HARRY ROSEN**, president of the Port Iron and Supply Company, Port Arthur, Texas has just placed an order for an Enterprise Diesel engine to augment the present power of his large dredge which is equipped with an Enterprise Diesel engine rated 700 hp. Port Iron & Supply is also planning a 54 foot tug which will be powered with an Enterprise Diesel engine, rated 250 hp. at 400 rpm.

**ENTERPRISE** has just been awarded a contract by the U. S. Navy for 20 more sets of main propulsion engines for the YTB Harbor Tugs designed by Consolidated Shipbuilding Company. Each tug will be equipped with two Enterprise engines rated 650 hp. and chain drives.

**ENTERPRISE** Engine & Foundry Company of San Francisco has just been awarded the contract of furnishing the main propulsion power for nine Garbage Lighters, type YG. Engines to be supplied are Enterprise of 300 hp. and is a duplicate of a previous order.



Mexico City's Department of Public Works Diesel Dredge

# 7 Important Advantages with VORTEX

## SPARK ARRESTING SILENCERS

**SOME DAY** — soon, we hope — you will be able to buy all the new Diesel equipment you need.

And when that day comes, remember — only **VORTEX Spark Arresting Silencers** give you these seven important features so essential to satisfactory operation of your Diesel engine:

### SPARK ARRESTING

1. With **VORTEX**, all sparks capable of causing fire are extracted by positive vortical action, without resorting to gravity or trapping methods.
2. **VORTEX** conducts sparks immediately and completely from the vicinity of the hot gas chamber via a dust channel, rendering re-ignition of carbon impossible.
3. Fine particles, ordinarily carried through in suspension, cannot escape because of **VORTEX's** anti-creepage ring.
4. Cleaning and internal maintenances are eliminated by **VORTEX's** vortical scouring action.

### SILENCING

1. Maximum degree of silencing is achieved by **VORTEX** because each silencer is engineered for the specific bore, stroke, speed and power of the engine with which it is to be used.
2. **VORTEX** does not house any turbulent high-resistant passages.
3. Size for size, **VORTEX** renders lower decibel rating with the same back-pressure.

Because of these outstanding features, you can confidently look for safe, quiet and efficient exhaust conditions if your Diesel of tomorrow is **VORTEX**-equipped.



### ENGINEERING SPECIALTIES CO., INC.

39 CORTLANDT STREET

NEW YORK 7

### VORTEX

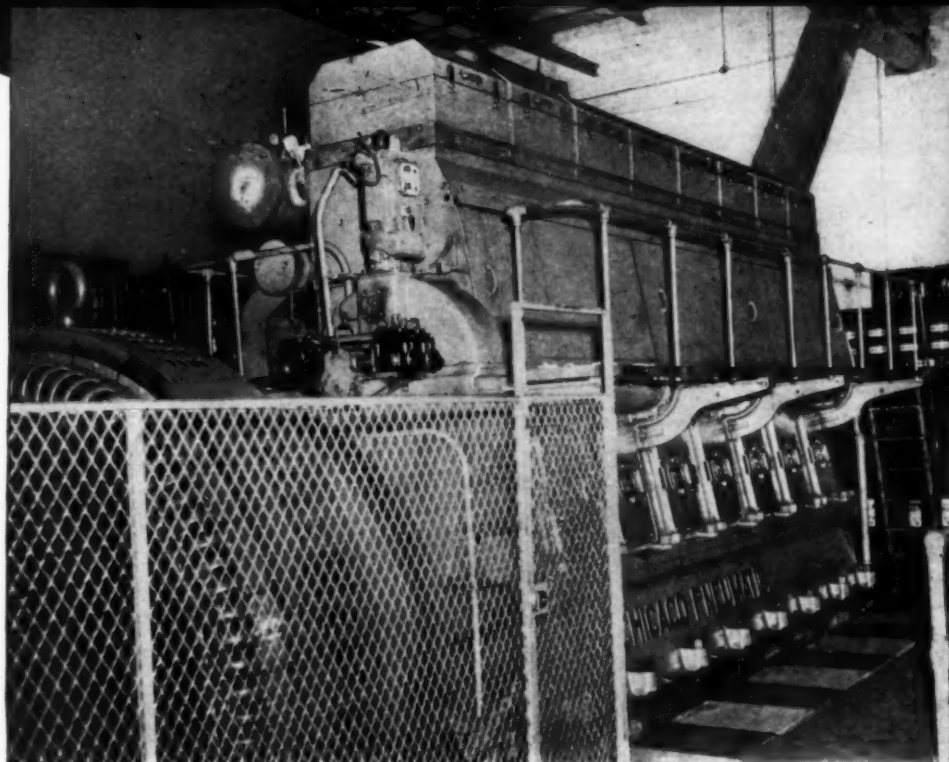
SILENCERS (Wet or Dry Types) - SPARK ARRESTERS - SPARK ARRESTER SILENCERS

### OTHER ENGINEERING SPECIALTIES PRODUCTS:

Vortex Dust Catchers - Vortex Steam Separators (Internal and Line Types) - Buckley's Piston and Valve Rings - Holland Patent Piston Rings - Champion (Rear End) Soot Blowers - Viking Contact Makers - Viking Pressure-Temperature Alarm Systems.



# Now There Are **3** CP ENGINES IN WELL-KNOWN MID-WESTERN UTILITY PLANT



**T**YPICAL of CP engine performance and good operating practice is the experience of a mid-western utility company — which has just installed its third CP unit.

The first CP Diesel was installed in this plant seven years ago. The second CP engine was installed three years ago — as a natural gas engine, convertible to Diesel operation. This CP unit made an outstanding record in its first year of service — operating at 77% load factor,

87% time factor — a total of 3,735,500 kwh generated at a power cost of 0.325¢ per kwh.

As a result of the performance of this CP gas engine, the utility has just installed a third CP engine — a duplicate of the CP unit which has shown such economy and dependability in its three years of operation.

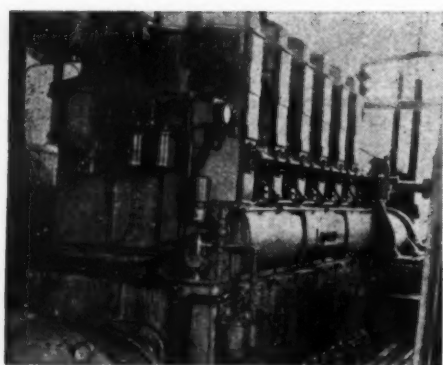
Write for information on complete line of CP Diesel Engines, all of which are readily converted to gas.

★★★★★★★  
PNEUMATIC TOOLS  
ELECTRIC TOOLS  
HYDRAULIC TOOLS  
ROCK DRILLS

CHICAGO PNEUMATIC  
TOOL  COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

★★★★★★★  
AIR COMPRESSORS  
VACUUM PUMPS  
DIESEL ENGINES  
AVIATION ACCESSORIES



*Enterprise 400 hp. Diesel on the Mexico City Dredge*

THE Mexico City drainage canal embracing a project of fifty-eight miles of waterways is progressing according to the engineering plan. It is a continuous grueling job with the dredge operating day and night. The job is being performed by an Enterprise Diesel engine operating a 12 in. cutting head and running 550 rpm. when cutter is used. 400 to 425 hp. is required and 16 millimeters is maximum on injection pumps.

#### **Ross Heater Opens Texas Office**

ROSS Heater & Mfg. Co., Inc., has established a direct factory office in Houston, Texas, under the management of John A. Coleman.

This is the seventh factory office opened by the Company devoted exclusively to the sales-engineering of Ross Heat Exchangers, Coolers, Condensers and Heaters. The other offices are located in Buffalo, Chicago, Detroit, New York, Philadelphia and San Francisco. In addition, there are sales representatives in principal cities throughout the country. The new Houston factory office is the second sales office in Texas, there being also a sales representative in El Paso.

Mr. Coleman joins the Ross organization with considerable background and unusually good qualifications for the selling and servicing of Heat Exchangers. Ten years with oil refining industries and the past nineteen years of sales work in the Houston and Dallas territories make him particularly well qualified for the management of this new Ross office. His early mechanical and chemical engineering training was obtained at Iowa State and Washington Universities. The office is located at 901 Citizens State Bank Building, Houston 2, Texas.

#### **May Oil Burner Corporation Wins Army-Navy "E" Award!**

IN recognition of its outstanding performance in producing a wide variety of war material,

May Oil Burner Corporation was awarded the Army-Navy "E" in Baltimore on September

This diversified production included everything from small Porro Prisms for binoculars, which serve as the eyes of our heavy artillery, to the azimuth indicators used on tanks, and the hydraulic pumps which are used for tractors for machine tools, for anti-aircraft guns, for tank turrets, for emergency steering control of Navy ships and for Navy boiler operations.



*Charles R. Collins, General Sales Manager, acting as master of ceremonies at Army-Navy "E" award to May Oil Burner Corp.*

Few plants engaged in war production can boast of such diversified production and in presenting the "E" award to May Oil Burner Corp.



### **SHE GOES STEADY WITH MACK**

• The Josephine Foster is a fishing boat owned by the Southern Shell Fish Corporation. She is 57 ft. 6 in. long; 19 ft. 2 in. wide, with a draft of 3 ft. 7 in. And she works out of Biloxi, Mississippi.

What's more she's always been a *successful paying boat!* That means she and her crew have been out on their job, fair weather and foul. It means she and her crew are *sturdy and reliable.* And

so's her engine. It's a Mack Diesel, with a two-to-one reduction gear, turning a 32 x 18 inch propeller.

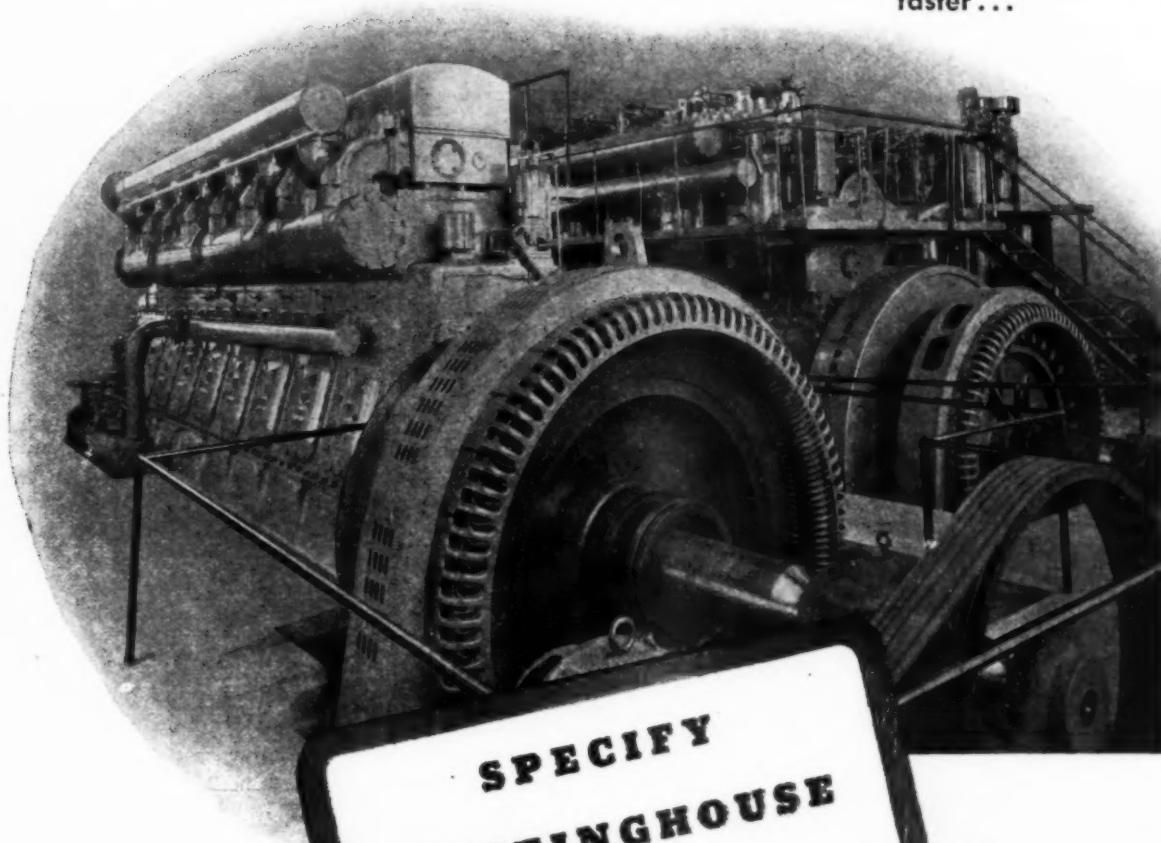
**MACK MANUFACTURING CORPORATION**  
Marine Engine Division, Empire State Building, New York 1, N.Y.

**Mack**  
**DIESEL**  
**MARINE**  
**POWER**

MACK MARINE ENGINES ARE A PRODUCT OF THE BUILDERS OF WORLD-FAMED GASOLINE AND DIESEL-POWERED TRUCKS, BUSES AND FIRE APPARATUS



**No. 1 TIP** for getting  
Diesel power on the job  
faster...



**SPECIFY  
WESTINGHOUSE**

**get the complete electrical equipment  
from one responsible source**



**Westinghouse**  
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

**A-C GENERATORS FOR  
DIESEL ENGINE DRIVES**

Split responsibility for electrical equipment means delays... lost time... confusion... both in ordering and installation, and when servicing or maintenance is necessary. Westinghouse offers three-way help in getting Diesel-generated power on the job—and keeping it there:

**One Responsible Source**—Westinghouse supplies the complete electrical equipment required for the installation—generators, exciters, voltage regulators, switchboards, circuit breakers, transformers, auxiliary equipment and controls. Time is saved in negotiation... full responsibility for electrical co-ordination is assumed by Westinghouse engineers.

**Matched Equipment**—Westinghouse generators are built to match the characteristics of the Diesel engines you purchase, regardless of make.

**24-Hour-Per-Day Service**—Thirty-three strategically located Westinghouse service shops provide round-the-clock service for all your electrical equipment.

For more information, call your nearest Westinghouse office or write for B-3028, "A-C Generators for Diesel Engine Drives." Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

J-10264

poration, Major Paul Carlson, who is in charge of the Baltimore Regional Office of the Philadelphia Ordnance District, cited this as an accomplishment of which every man and woman at May Oil Burner Corporation can be very proud. Acceptance of the award was made by A. Klotzman, Vice-President of May Oil Burner Corporation. Lt. Comdr. F. J. Singley, Jr., Executive Officer of the Baltimore Zone Office of the Naval Intelligence Service presented the "E" award pins. Charles R. Collins, General Sales Manager, acted as master of ceremonies.

### The Woodward Governor Post-War Employment Policy

**EDITOR'S Note:** Woodward Governor Company did not seek publicity with respect to its Post-War employment policy, neither does it claim uniqueness in its attitude. There is, however, in the Woodward policy a warmth of feeling and sincerity of purpose which transcends the mere matter of providing jobs to those returning from the Services. Upon entering the armed forces each Woodward employee

was given the following certificate.

To those members of the Woodward Governor Company who are now serving, or will in the future be called upon to serve, in the armed forces of the United States of America:

WE, THE MEMBERS OF WOODWARD GOVERNOR COMPANY, realizing that you are assuming the most difficult task to be done, namely, the winning of the war, and we will remain behind, wishing to contribute everything we can to strengthen your morale and aid and comfort you, have in full assembly on the evening of March 20, 1942, set up and agreed to certain policies listed below.

We are extremely proud of you and want you to feel that you are valued members of the organization, no matter where you may be. This company is your industrial home and we are your folks, ready and anxious to do anything possible for you here at home while you fight.

1. You will be considered as on a leave of absence from the company while you are in the armed forces. Your badge will replace in a case provided for that purpose, ready for you when you return.
2. Your group insurance must necessarily be cancelled, because the insurance company will not carry it. In lieu of the cancelled insurance you will receive \$100.00 in cash. This will provide you with a varying amount of National Service Insurance, depending on your age, but in any event, will provide a minimum of \$1,000.00 of insurance for a period of five years. Upon your return your company insurance will be reinstated, based on your seniority at that time.
3. You will receive a check at the end of the fiscal year covering your proportionate share of such bonus as may be paid in the year in which you join the armed forces.
4. Your service status will accumulate as if you were still on the job here, so that when you return your service status will be the same number of years you were actively with the company, plus the years you spend with the armed forces.
5. When you return, every effort will be made to reestablish you in the same status as formerly held in the company.

Fellows, we salute you and wish you the best of luck and a happy return when your job is completed.

THE MEMBERS OF THE  
WOODWARD GOVERNOR COMPANY



**PRECISION MADE  
for  
PRECISION USE**

"Chicago Screw" manufactures millions of precision-made screw machine parts for diesel and gasoline engines, stationary industrial engines, truck, passenger car, tractor, bus and aircraft engines . . . Quality and accuracy are rigidly controlled throughout every operation from rough stock to finished material . . . Because precision-made screw machine parts are the products—not the sidelines of "Chicago Screw", this company is qualified by complete facilities and many years of experience to help you in your postwar planning.

You will need a dependable source of supply for fine precision-made, close-tolerance screw machine products and "Chicago Screw" is anxious to serve you.




**THE CHICAGO SCREW CO.**  
ESTABLISHED 1872  
1026 SO. HOMAN AVENUE CHICAGO 24, ILL.



# ... That ships can move Materiel-Munitions-Men

## I AM PROUD TO FIGHT...

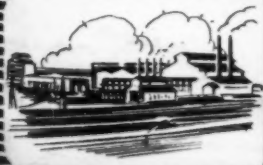
I began life as a 33,000lb. white-hot billet of fine steel. Forging Hammers and Presses, Heat-treating Furnaces, Machines and Men trained me down to fighting weight . . . around 10,000 lbs. ringside.

I drive Liberty Ships, Submarines, P-T Boats, the Diesels of War.

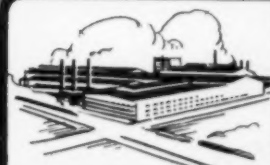
I am proud to fight for the United Nations . . .

I was wrought, forged, seasoned and machined by expert designers, engineers and craftsmen at Erie Forge Company.

My counterparts..Shafting, Connecting Rods, Crankshafts, Steel Forgings and Castings..are good tough fighters for the battle of the Nations and for Industry.



**ERIE FORGE COMPANY, ERIE, PA.**



## Alaska-Pacific Supply Company Appointed Hendy Diesel Agent

APPOINTMENT of the Alaska-Pacific Supply Company, 64 Marion Street, Seattle, Wash., as agent for Hendy marine and stationary Diesel engines and parts is announced by the Joshua Hendy Iron Works.

Exclusive territory of Alaska-Pacific is the state of Washington for stationary and marine Diesels, the Oregon coast and Columbia river for marine engines, and Alaska for stationary,

marine, and generator units to be used in all commercial vessels and canneries.

Established in 1939, Alaska-Pacific has Leon F. Sutter as president and manager and C. Fain Sutter as secretary-treasurer. Included on the sales force is Ray Johnson, who for 17 years was associated with the Johnson Manufacturing Company of Seattle. The firm specializes in engines and engine-room supplies, and is prepared to make complete installations, supplying full service through its service organization.



helps  
supply-port crane  
keep on the job  
24-hours a day

The photo at the right shows the NUGENT Lubricating Oil Filter used on the diesel engine of the huge electric crane operating at a busy supply port. At the right is a close-up view of the filter. Patented construction gives this unit 468 sq. in. of filtering area.



Protecting the lubricating oil in the Diesel engine of an electric crane operating at a large foreign supply port is another vital wartime task performed by NUGENT Filters. These cranes operate many times throughout the 24-hour day and it is essential to minimize the risk of engine failure due to dirt or foreign matter in the lubricating oil.

NUGENT Lubricating Oil Filters are

widely used throughout industry wherever dependable Diesel operation is essential. Clean oil helps to keep oil in service longer and at the same time adds hours of life to Diesel engines, reduces maintenance costs and increases engine efficiency.

Get full details today on the complete line of NUGENT lubricating oil and fuel oil filters for your Diesels.

Wm. W. NUGENT & CO., Inc., 404 N. Hermitage Ave., Chicago 22, Ill.



Industrial Equipment Co., 6435 Ham-  
ilton Ave., Detroit, Mich.  
H. J. Kelly, 816 Howard Ave., New  
Orleans, La.  
Thos. A. Short Co., 245 Fremont St.,  
San Francisco, Calif.

#### DISTRIBUTORS:

Dallas S. Deem, 1215 So. St. Louis  
Ave., Tulsa, Okla.  
Harlan G. Bosler, 4452 W. 54th Pl.,  
Los Angeles, Calif.  
Darling Bros., Ltd., in all Canada.

# NUGENT FILTERS

A complete stock of parts will be carried by the new distributors. Currently, Hendy is building more than 100 Diesel-generator sets to provide auxiliary power for the Maritime Commission's new CI-M-AV1 cargo ships.

## Greatly Improved Diesel Efficiency Dial

THIS unique calculator serves as a trouble shooter's guide, automatically correlating cylinder pressure and exhaust temperature readings to show at a glance defects in Diesel engine operation. It lists cylinder pressure conditions—normal firing, high firing, low firing, high compression, and low compression—on the inner dial. High, low, and normal exhausts are listed on the outer dial. By revolving the outer dial to the desired combination of engine conditions, a reading indicating defects in engine operation appears in the window. For example, if the engine exhaust temperature is normal with a low cylinder compression pressure, the calculator indicates that the air cleaner or silencer is clogged, or that blower air delivery is below par; whereas when the engine exhaust temperature is high with a low cylinder compression pressure the calculator indicates leaky valves, leaky or stuck piston rings, or worn cylinder liner.



Information contained on this new model is very much more complete than that on the original device developed by this company, and is the result of extensive field study. The dial greatly simplifying interpretation of engine indicator tests, is a time saver for Diesel engine engineers and maintenance men, and a practical aid for Diesel school instructors and students. While designed primarily for users of the many types of engine indicators made by Bacharach, a limited quantity has been allotted for educational purposes and copies will be sent upon request while the supply lasts. Address: Bacharach Industrial Instrument Company, 700 Bennett Street, Pittsburgh 8, Pa.



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ne Commis  
ANNOUNCEMENT has just been made by  
General Sales Manager H. H. Howard of Cater-  
pillar Tractor Co., Peoria, Illinois, that W. K.  
Cox has been advanced to the position of  
Assistant General Sales Manager.

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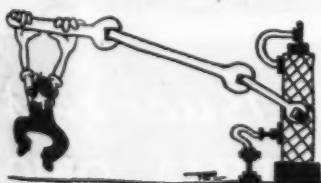
W. K. Cox

Cox joined the company in 1928 as a spe-  
cial representative on logging sales, moving on  
industrial and general sales work in 1932.  
In 1936 he was assigned to the Advertising  
Department, returning to sales a year later, as  
Assistant Manager of the Sales Development  
Division. In 1941 he was appointed Assistant  
Manager of the Eastern Division, becoming  
manager of that division in 1943. During  
the early part of the war he spent one year as  
manager of the newly-formed expediting di-  
vision, a unit set up to speed the delivery of  
purchased raw materials.

William S. Ziegler, with the company as a field  
representative since 1929, was made Assistant  
Sales Manager of the Eastern Sales Division  
in 1944, and is now appointed to the  
position of Sales Manager of that division.

D. Haberkorn, the company's representative  
in Texas and Oklahoma, has been appointed  
Assistant Sales Manager of the Eastern Division.

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Diesel engine  
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## Helps get MUCH LONGER Service from Engines before Overhauling

That is proved by actual service records on Diesel and  
other engines, large and small, in various industrial and  
transportation fields.

This is a perfectly NATURAL result of keeping engines  
COMPLETELY lubricated, CLEAN and FREE RUNNING  
—by adding POW-R-FLO to the lubricating oil as pre-  
scribed by our Engineering Service.

POW-R-FLO is a PURE, colorless mineral oil—CLEAR as  
glass—free of all impurities and residues—non-corro-  
sive, heat-resisting, high-capillary action. POW-R-FLO  
INCREASES the film strength of the oil to which it is  
added, minimizes film friction even with heavy oils,  
penetrates into close tolerance and super-heated inter-  
nal engine surfaces, forms a tough, oily film between  
working parts.

DETERGENT ACTION dissolves gummy deposits, retards accum-  
ulation of varnish, carbon and sludge; keeps sludge in suspension in  
the oil for easy removal by the filters. Oil stays clean and efficient  
much longer.

ABSOLUTELY HARMLESS to any internal combustion motor, no  
matter how much is used. Yet only small quantities, used regularly,  
are required to do a REAL JOB!

### ENGINEERING SERVICE demonstrates Results.

Without cost or obligation, we will run tests of POW-R-FLO Pre-  
scribed Lubrication on one of your Diesel engines in use—and let  
YOU be the judge of its SAVINGS in operating and upkeep costs.

Write for full information

**The Mauston Corporation**

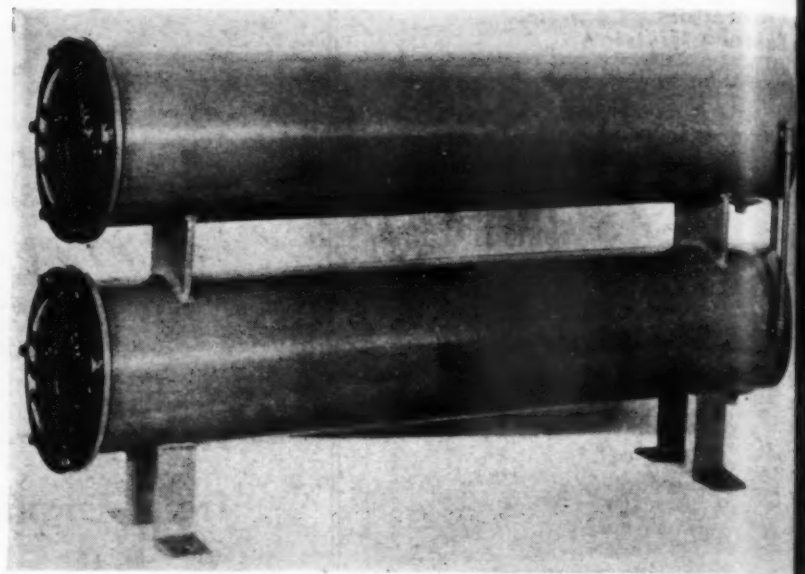
WINONA

MINNESOTA

### The Wix-Bode Lube Oil Filter

**T**HE Wix Accessories Corporation has announced a Diesel lube oil filter carrying the above trade name. It is fabricated of substantial steel casing with heavy cast end plates capable of withstanding excessive pressures without failure. The filter element is the throw-away type and is made up of a scientifically blended mixture of white cotton threads and imported vegetable fibre covered with a precision knit sock-type binder. Suitable for use with detergent oils the filter may be connected up for continuous by-pass lube filtration, thereby taking advantage of the engine lube system operating pressure and temperature without affecting the oil pressure on the oil header of the engine.

Operation of the Wix-Bode lube filter is automatic without the use of spring loaded valves or other mechanical devices. Full particulars will be supplied on request to Wix Accessories Corporation, Gastonia, North Carolina.



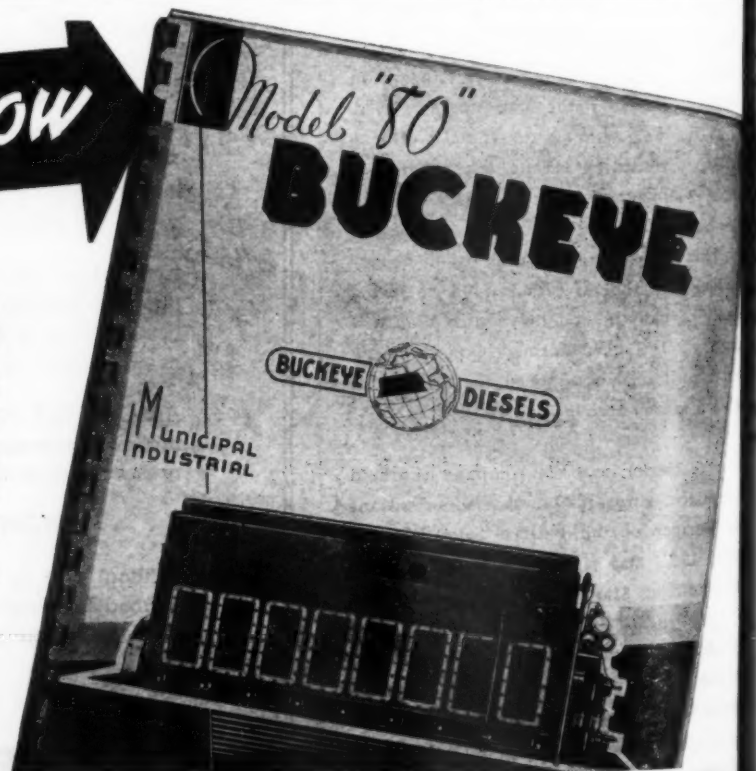
*Illustration above shows a duplex Wix-Bode lube oil filter unit and right, the throw-away type filter element.*



## WE WANT YOU TO KNOW

To this end we have prepared a completely informative bulletin embodying a general description with tabulation of outstanding features, specifications and performance curves on the Model "80" line of Buckeye Diesel engines. Each component part of the engine is illustrated and described; fuel, lube and cooling systems are traced on three-color sectional charts.

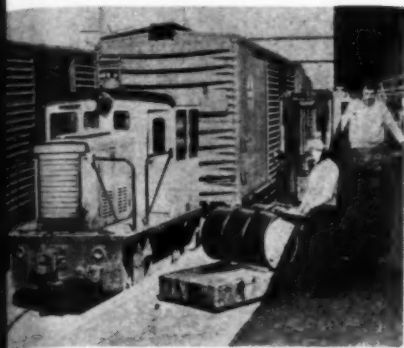
*Write on your letterhead for your free copy of The Model "80" Buckeye Diesel Bulletin.*



*Be Profitwise and Dieselize with Buckeyes*  
**THE BUCKEYE MACHINE COMPANY ..... LIMA, OHIO**



### 23-Ton Diesel-Electric Works Double Shift



WHEN this G-E 23-ton Diesel-electric switcher locomotive replaced a 12-ton gas unit in the shipping yard of the Tidewater Associated Company's Avon, California, refinery, it multiplied the number of cars that could be handled at one time by four. When a sharp increase in plant activity necessitated 16-hour switching service, the new unit took the double shift in stride. Although the tonnage of the Diesel-electric is practically double that of the gas locomotive and the amount of work to be done much greater, operating costs are less; namely, \$2.26 per hour including engineer and fireman, as compared to \$2.39. Built by General Electric, this 23-ton locomotive is typical of a complete line of the most modern locomotives used in hundreds of industrial plants to increase the speed, efficiency, and economy of material handling of materials.

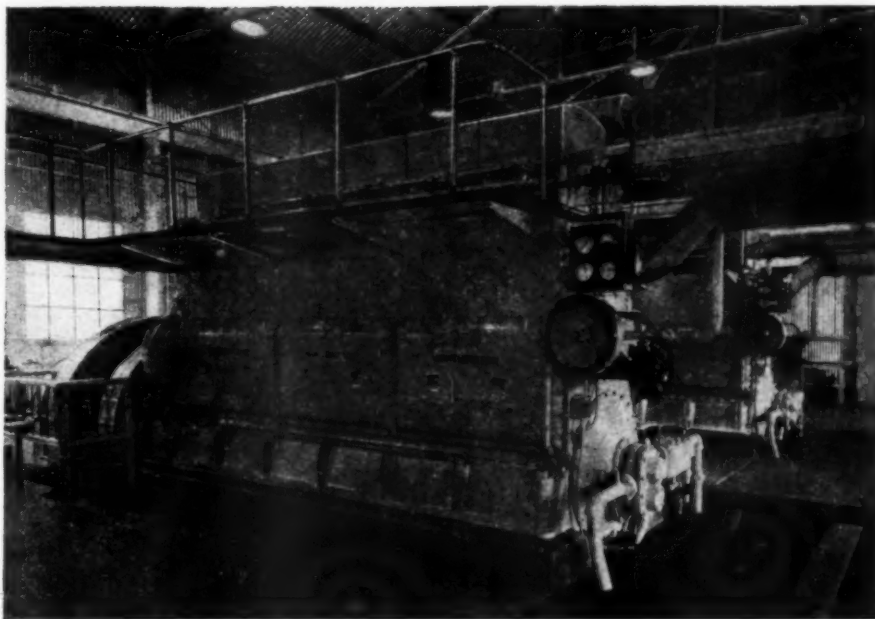
### Fluor Publishes Spanish Edition Aerator Cooling Tower Bulletin

THE Fluor Aerator Cooling Tower Bulletin, illustrated in three colors, containing extensive engineering charts and data, also details of construction and erection of Fluor cooling towers has been printed in Spanish. Free copies of this informative bulletin may be secured by writing The Fluor Corporation Ltd., Los Angeles 22, California.

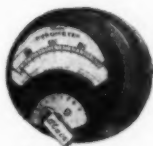
**FOR VICTORY**



**BUY  
UNITED  
STATES  
WAR  
BONDS  
AND  
STAMPS**



## Rely on Alnor for accurate exhaust temperature indications



Type AX, Alnor  
Exhaust Pyrometer

The routine check of exhaust temperatures with Alnor Pyrometers provides a reliable guide to efficient Diesel performance, and correct maintenance and adjustment. As in so many of the Diesel power plants setting records for continuous service, these Worthington convertible Diesel gas engines are equipped with Alnor Exhaust Pyrometers.

Alnor Exhaust Pyrometers are built in a complete range of single and multi-point types, to meet the needs of any engine, large or small. Write for special Exhaust Pyrometer bulletin.

## ILLINOIS TESTING LABORATORIES, INC.

420 North La Salle Street  
Chicago 10, Illinois

\$5.00

# DIESEL ENGINE CATALOG

VOLUME NINE

**295 ENGINES** described...  
profusely illustrated

**VOLUME 9**

The Ninth Edition of the DIESEL ENGINE CATALOG, edited by Rex W. Wadman, is now available. This is not a reprint of previous volumes — the book has been completely revised and now contains descriptions and detailed specifications of over Two-Hundred and Ninety-five engines — profusely illustrated. Color is freely used to trace fuel, lube, and cooling systems. Nothing like it published. A large section is devoted to equipment associated with Diesel installation and operation and there is a directory of Diesel Engine and Accessory manufacturers. The most useful Diesel book available — widely used by those who specify and buy Diesels and accessories and by engineers in all fields of power application. An indispensable book for all who want to know Diesel engines and their applications.

Also Diesels for Universal Application  
Alco Stationary Diesels  
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Anderson Model KD  
Atlas Imperial Diesels  
Atlas Lancia Diesels  
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Busch-Sulzer Bros. Diesels  
Caterpillar Automotive Diesels  
Caterpillar Industrial Diesels  
Caterpillar Marine Diesels  
Chicago Pneumatic Diesels  
Chrysler Diesels  
Clark Bros. Diesels  
Climax Models D 148 and D 197  
Cooper-Bessmer Diesels  
Cummins Diesels  
Cummins Fuel Injection System  
Dodge Lancia Diesel  
Enterprise Standard & Supercharged Diesels  
Fairbanks-Morse Diesels  
Fulton Iron Works Co., Models RR, BGS and KS  
General Motors Diesels  
Gray Marine Diesels  
Guthrie Radial Diesels  
Hamilton Diesels  
Johns-Hendy Series 50 Diesels  
Hercules Automotive Diesels  
Hill Model R Diesels  
Ingersoll-Rand Type "S"  
International Tractor and Industrial Types  
Kahlenberg Marine and Stationary Diesels  
Korvath 4-cycle Marine Conversions  
Lathrop Types D-50 and D-60

Lister-Blackstone Models CD and CE  
Lorimer Slow Speed Heavy Duty Diesels  
Mack-Lancia Trucks, Bus and Marine  
Murphy Diesels  
Nordberg Convertible Diesel-Gas Engines  
Nordberg 2-cycle Diesels  
Palmer Bros. Type BND  
Rainbow-John Diesel and Gas Engines  
John Reiner Diesel Marine Auxiliary Unit  
Sheppard Models 6 and 7  
Superior (National Supply Co.) Diesels  
Union Marine and Stationary Diesels  
United States Motors Diesel-Electric Plant  
Vern-Severin Diesels  
Washington Industrial and Marine Diesels  
Waukesha Hexastroke Industrial Type  
Waukesha Multi-fuel Oil Engines  
White Diesels and Diesel Electric Plant  
Wolverine 2- and 4-cycle Diesels  
Warrington Diesels

## EQUIPMENT DESCRIBED

Adeco Fuel Injection Equipment  
American Bosch Fuel Injection Equipment  
Demco Fuel Injection Equipment  
Bender Scintilla Fuel Injection Equipment  
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American Blower Hydraulic Coupling  
Durable Pump Valve Service  
Diamond Chain Drives  
Rosa Convertible Supercharging System  
B-W, formerly McCulloch, Rosa-Type  
Superchargers  
Elliott (Buchi System) Turbine Superchargers  
Elliott Electromagnetic Slip Couplings

**ORDER YOUR COPY NOW**

DIESEL ENGINES, INC. — Two West Forty-Fifth Street — New York 19, N. Y.

Enter my order today for a copy of the New Diesel Engine Catalog, Volume Nine, Edited by Rex W. Wadman, for which I enclose \$5.00.

NAME .....

ADDRESS .....

PLEASE PRINT NAME AND ADDRESS

EMBER 1944



## Cooper-Bessemer Adopts Profit-Sharing Employee Suggestion Plan

The wealth of production ideas in the minds of employees is being tapped by the Cooper-Bessemer Corporation by adopting a system based on a definite financial incentive for employees who suggest production short-cuts, material savings or reduction of safety hazards. Experience from War Production Drive incentive convinced the company that a suggestion plan with more tangible benefits should become a permanent policy, Cooper-Bessemer said in announcing a plan which sets no limit on maximum amount which can be earned.

Terms in the proposed plan are based on a percentage of the first year's savings resulting from the employee's suggestion. If the net estimated saving is \$10,000.00, the suggester will receive \$1000. The payment is to be 10 per cent of any savings effected, but in no case is it to be less than \$5.00 for an accepted suggestion.



Employee suggestions like this are wanted by Cooper-Bessemer which is adopting a plan by which employees a percentage of savings effected. Harold Clarke, right, is receiving a special award check for \$100.00 from T. J. McMan, left, Grove City works manager, for suggestion which saved 2069 manhours during 12 months in production of engine valves.

Suggestions are to be analyzed by a committee made up of six members—three representatives of labor and three representatives of management. Intangible suggestions will be handled by a committee made up of labor and management representatives.

The new employee suggestion policy will be implemented immediately upon its approval by the Labor Board and the Commissioner of Internal Revenue, according to the company. The policy, it was said, is a formal development of the voluntary plan that has been followed in the past two years. The company believes the old plan initiated under Labor Manage-

ment-War Production Drive activities did not provide sufficient incentive for the workers and did not have the benefit of authority and organization to stimulate and maintain employee participation.

## Navy Extends Use of Diesels

THE power plants for all landing craft now being built are Diesel engines supplied by the Detroit, Electro-Motive and Cleveland Divisions of General Motors, it was recently made known. To date one unit of the General Motors Cor-

poration, the Detroit Diesel Engine Division, alone has turned out more than 100,000 six-cylinder engines, most of which have been installed in the armed forces' landing craft.

Diesel horsepower in use by the Navy has been steadily increasing and the building program for 1944 calls for engines equal to the total of those powering craft in operation in July, 1943. In October of 1943, Diesel horsepower passed the total steam power in use by the Navy. Use of Diesel covers all types of Naval craft and in

**PRELUDE TO INVASION**  
 Born of American ingenuity, these "ugly ducklings" (LST), equipped with Wittek Hose Clamps, are aiding the Allied cause immeasurably as one of the most effective and startling types of ships the war has produced. Official U. S. Navy Photograph.

**Dependable Hose Connections  
For Diesels Assured with**

**WITTEK  
HOSE CLAMPS**

Type FBC

Type RN

Type RM

Type RW

Because of their design, construction and ease of installation, Wittek Hose Clamps assure dependable hose connections for Diesel engine builders. Long accepted by the automotive and aviation industries, Wittek Hose Clamps are now being proven in actual service with the armed forces of the United Nations as standard equipment for LST's and Half Tracks shown above as well as aircraft, tanks, jeeps, trucks, ships and other combat vehicles. Wittek Hose Clamps are made in many different sizes and types for Diesel applications: Type RW for hose connections of 5" in diameter and larger; Type RM for 3 1/4" to 5"; Type RN for 2 1/2" to 3 1/2" and Type FBC for 2 1/2" hose connections and smaller. Write for complete catalog. Wittek Manufacturing Co., 4305-15 W. 24th Pl., Chicago 23, Ill.

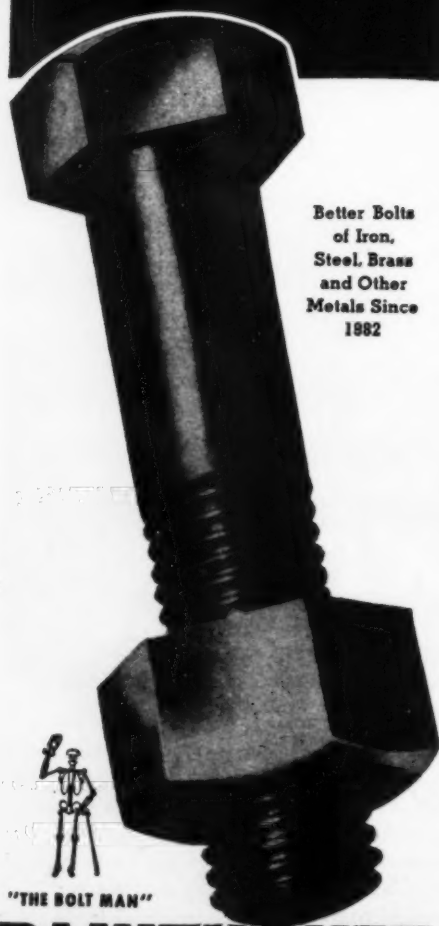
War Bonds for Victory  
Buy MORE in '44!

**WITTEK HOSE CLAMPS**  
Dependable Hose Connections

USE HEADED AND THREADED FASTENERS  
FOR ECONOMY AND RELIABILITY

# BRASS BOLTS · NUTS STUDS

Brass and bronze, all types—every non-ferrous metal—available in all standard dimensions or to your specifications.



Better Bolts  
of Iron,  
Steel, Brass  
and Other  
Metals Since  
1882

## PAWTUCKET

MANUFACTURING COMPANY,  
327 Pine Street • Pawtucket, R. I.  
THE PLACE TO SOLVE YOUR BOLT PROBLEMS

the case of General Motors-built power plants, it ranges from the smallest landing craft to the large ocean-going LST in which the Electro-Motive Division supplies the engines of the type used in the streamlined locomotives.

In addition, 71 Series Diesels are used for ships' auxiliary power. A recent telegram from Rear Admiral Cochrane, Chief of the Bureau of Ships, to the men and women of Detroit Diesel quotes "A Sub-Chaser commander who has participated in four major landings in the South Pacific has high praise for the 2-71 generator sets which have seen more than 7000 hours of rugged duty with only minor repairs."

One of the outstanding contributions to marine warfare has been the development of the 900 hp. Quad, four Series 71's coupled together in such a manner that the disabling of any one unit will not affect the power production of the other three. This engine, which is being turned out in quantity by the Detroit Diesel Engine Division, is used in the LCI.

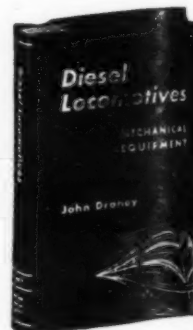
70.9 per cent of all Diesel horsepower being used by the Navy on January 1, 1944, was supplied by the Detroit Diesel, Electro-Motive and Cleveland Diesel Divisions of General Motors. Of this amount, 44.3 per cent was the Series 71 produced by the Detroit Division. In the LCI two Quads with a capacity output of 1800 hp. are used to propel the 157 ft. landing craft for infantry, while the LCT, a 105 ft. vessel used for landing tanks, utilizes the power produced by three Series 71 engines and still another landing craft, the LCM, uses two of these engines. The LCVP, a 36 ft. craft used for landing vehicles and personnel, has one of the Series 71 engines while still another use is found for them on the ocean-going LST where they supply auxiliary power.

Completing the list of landing craft powered by GM is the most recent addition to the amphibious fleet, the LSM, the power for which is being produced by the Cleveland Diesel Engine Division, which also supplies a large percentage of the Diesel engines used in the Navy's ever growing fleet of Submarines, Sub-Chasers, and Destroyer Escort vessels.

### Barnes Rotary Pump

A NEW, low pressure, rotary pump, which is designed for industrial application and affords an efficient and economical method for pumping all types of liquids having lubricating qualities, has been announced by the John S. Barnes Corporation of Rockford, Illinois. The new Barnes pump is ideally adapted for use as a

## RAILWAY LOCOMOTIVE ENGINEER ADVISES DIESEL



Just Published

The First Books of their Kind.

A practical guide to the operation  
and maintenance of

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By JOHN DRANEY,

Past President, United Association of  
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In collaboration with Diesel technicians from  
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Works; Electro-Motive Division of General  
Motors Corp.; General Electric Co.; Westinghouse  
Electric & Mfg. Co.; and many others.

—Interesting Table of Contents—

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Characteristics of Engine Cycles—Combustion Principles in Modern Diesels—Combustion in High-Speed Diesels—Fuel-Injection Nozzles—Fuel-Injection Pumps—Lubrication and Cooling Systems—Governors—Supercharging and Turbo-Charging—Air Filtration—Caterpillar Diesel—Cummins Diesel—Hercules Diesel—Cooper-Bessemer Diesel—American Locomotive (McIntosh & Seymour)—Baldwin Locomotive Diesel (De la Vergne)—General Motors Diesel-Electro-Motive Division—Fairbanks Morse High-Speed Diesel—Description and Operation of Mechanical Equipment—Maintenance Instructions—Trucks—Auxiliary Equipment—Vapor-Clarkson Steam Generating Units.

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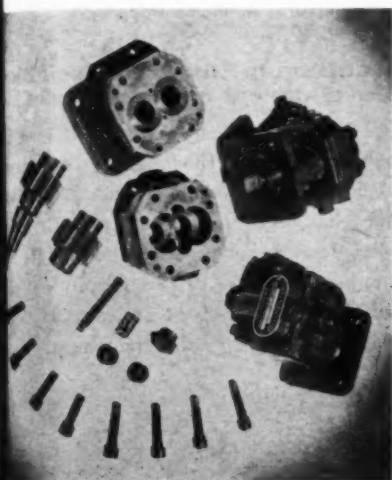
operating booster pump for oil lines, a gas-  
dispensing pump and for oil pressure sys-  
on automotive, truck or tractor equipment.  
is also proven ideally suited for use on  
torque Converters. Capacity of the Barnes  
pump ranges proportionately from one gallon  
minute at 600 rpm. to four gallons per  
minute at 2400 rpm. It has a high volumetric  
efficiency pumping extremely low viscosity

A feature of the new pump is the Barnes pat-  
ented spur gear tooth form. Tooth construc-  
tion of the Barnes spur gear completely elimi-  
nates excessive sliding, and reduces slippage of  
the fluid to an absolute minimum; each tooth  
completely fills the mating space, as the gears  
mesh, and perfect sealing action is effected.  
Thus positive displacement of the fluid is as-  
sured despite variation in fluid viscosity or  
other factors.

### F. E. Ashinger Named Perfect Circle Veterans' Employment Manager

ANTICIPATING the return of its 765 men  
and women in military service, The Perfect Cir-  
cle Company has named F. E. Ashinger as Vet-  
erans' Employment Manager for its four Ameri-  
can plants, according to an announcement just  
released by Howard M. Dirks, Director of In-  
dustrial Relations.

An extensive program of re-employment and  
rehabilitation is planned by the Perfect Circle  
organization under Mr. Ashinger's direction.  
Close contact has been maintained between the  
company and its employees in the service since  
the war started, and it is anticipated that jobs  
will be waiting for all of those who want to  
rejoin the organization when they return.



Component parts of the new Barnes Rotary  
Pump.

## ECLIPSE HOSE by BENDIX

PRECISION BUILT"  
SEAMLESS FLEXIBLE  
METAL HOSE

War Proved  
AND PACKED  
WITH "KNOW  
HOW" FOR TOUGH  
JOBS



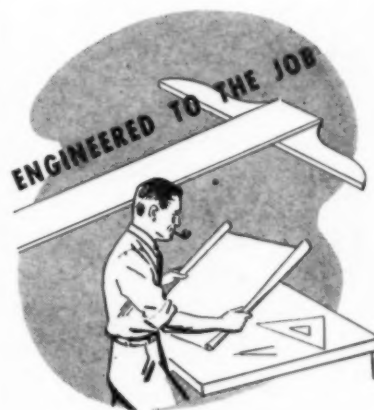
Special hose in large  
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Supplied for Diesel  
engine exhaust and  
other applications.

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Philadelphia Division:

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LONGER

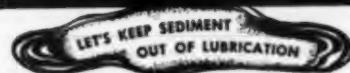
The oil lasts longer—and so does the  
engine. Here's the reason. The ex-  
clusive WGB cartridge removes from  
oil not most, but *all*, the enemies of  
engine-life—dirt, sludge, water,  
harmful acids, colloidal carbon. It is  
easily installed by hand, without tools,  
and replacements cost less than oil  
changes. Heavy-duty WGB Clarifiers,  
for all gas and Diesel engines, are  
rugged, simple in design and oper-  
ation, and each model is specifically  
designed for the job it has to do.  
Bank on the proved reputation of  
WGB oil clarifying. It saves time,  
money, overhauls, oil, and irre-  
placeable engine  
parts.

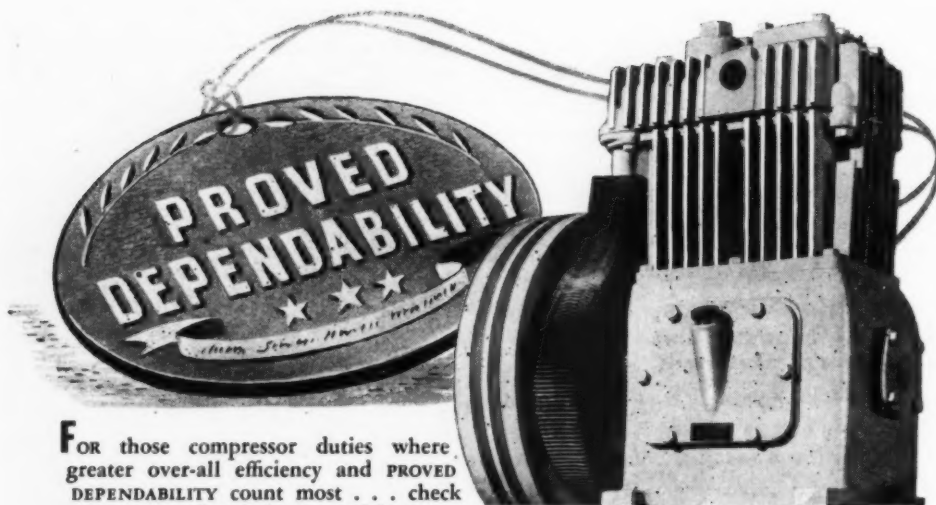


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low-cost WGB oil  
clarifying—for gas  
and Diesel engines—  
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KINGSTON, N. Y.





FOR those compressor duties where greater over-all efficiency and PROVED DEPENDABILITY count most . . . check the reasons for Quincy's enviable reputation. You'll find it rests solidly upon advanced, improved design features — both inside and out. For Diesel starting and other services requiring intermittent pressures up to 500 lbs. per square inch, Quincy offers the most complete line of compact compressors ranging from 1 to 80 cubic feet displacement in air and water cooled models. As exclusive manufacturers of air compressors for nearly a quarter century, Quincy specialists stand ready to help you. Call one in on your next compressed air problem. Or write Dept. K-18.

**Quincy**  
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QUINCY COMPRESSOR CO., Quincy, Illinois • Branch Offices: New York • Chicago • San Francisco • St. Louis

### BUYER NO. 3 POPS THE QUESTION

**"Can This Used Truck Take a Beating?"**

**USED TRUCKS**

The ALL-METAL LOCK is Built-in Here

**\*OPERATORS OF 110,000 MOTOR VEHICLES**

indicated in this survey that if a vibration-proof nut like the above were standard on their post-war equipment, tens of thousands of dollars for maintenance and repairs would be saved.

**BOOTS**  
SELF-LOCKING NUTS

There's No Room for a Nut Shaking Loose

Do loose nut breakdowns lower the trade-in value of your vehicles?

More than 1100 operators of over 110,000 vehicles said, "YES!" in a recent survey.\* They named over 60 trouble centers in their trucks, taxis, trailers and buses where loose nuts shorten machine life, and 3 out of 4 asked for "a good, all-metal nut that vibration will not loosen!"

The Boots Self-Locking Nut meets their most exacting requirements. Tested on the worst danger spots in many trucks, twelve months of hard-driving wear and tear couldn't shake it loose from a single connection.

Secured by its built-in all-metal lock, the Boots Nut holds with a grip of steel. Removed with an ordinary wrench, it can be used again and again without accelerated locking loss. Won't slip in gasoline, oil, water, chemicals, heat, cold.

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Perfect Circle's program for veterans include (1) continuing contact with men and women in the service until after they are completely re-established in their civilian occupations, (2) special training (3) recognition of special skills and experience acquired while in service, (4) counselling on educational opportunities, (5) other rights and privileges accorded veterans by the government, (6) cooperation with all agencies concerned with veteran placement, and (7) special consideration for men who may return with physical handicaps.

### Kauffmann Named as Mack Diesel Development and Research Chief

APPOINTMENT of William M. Kauffmann as assistant to the chief engineer, in charge of Diesel engine development for Mack Truck Inc., has been announced by L. C. Joseph, vice president and chief engineer of Mack. In his new capacity, Mr. Kauffmann will supervise the truck firm's greatly enlarged facilities for Diesel research and development.



• William M. Kauffmann

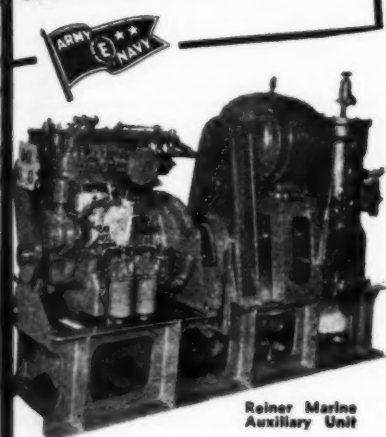
A graduate of the Illinois Institute of Technology, Mr. Kauffmann has had 20 years' experience in Diesel development. He previously was assistant chief engineer of the engine research and development division of Worthington Pump and Machinery Co., Buffalo, and chief development engineer of National Transit Pump and Machine Corporation, Oil City, Pa.

Other important posts held by Mr. Kauffmann during the past 20 years include that of design engineer of Baldwin De La Vergne, Philadelphia, and research engineer of the Superior Engine division of the National Supply Co., Springfield, O.



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11-RC-1

### Cooper-Bessemer President Elected to Executive Committee of Machinery & Allied Products Institute

GORDON LEFEBVRE, president of the Cooper-Bessemer Corporation, Diesel engine manufacturers at Mt. Vernon, Ohio and Grove City, Pa., has been notified of his election to the executive committee of the Machinery & Allied Products Institute.



Gordon Lefebvre

Election of the Cooper-Bessemer president was to fill one of five vacancies on the committee while 10 other members succeed themselves, according to the Institute's nominating committee. The executive committee on which Mr. Lefebvre serves is made up of executives from the country's leading machinery builders.

### General Controls Announce New Kansas City Branch

GENERAL Controls Company of Glendale, California, announce the opening of a new Kansas City Branch at 421 Southwest Boulevard, Kansas City 8, Missouri, with Robert Courtney in charge as Branch Manager. The new quarters provide complete facilities for serving customers in Kansas and in adjacent areas in Missouri, Nebraska and Iowa. Bob Courtney is well qualified to extend this service by his long experience and thorough knowledge of automatic temperature, pressure and flow controls and their many uses in the domestic, commercial and industrial fields.



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A complete line of lube oil purifiers using Fullers Earth - cotton waste and specially prepared filtering agents.

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A simple, economical and foolproof method of restoring contaminated oil to the full value of new oil - for direct connecting to one or more Diesel engines for continuous or intermittent operation.



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A perfect method for contact oil purifying for complete oil reconditioning. For batch purifying directly from engine lube oil system or transfer tanks.



The Hilco line offers you a complete lubricating oil purifier service. Write today for free literature and see what Hilco operators are doing - then let us help you select a Hilco to take care of "That Particular Job."

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**NEW MODEL  
HIGHEST ACCURACY  
CHRONOMETRIC  
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Readability to 1 RPM per division. Guaranteed accuracy well within  $\frac{1}{2}$  of 1%. Indicates RPM directly on the dial without any calculations over a fixed period of 6 seconds. Negligible torque. Two models with ranges 0-1000 RPM or 0-10,000 RPM, each suitable for double rated range.

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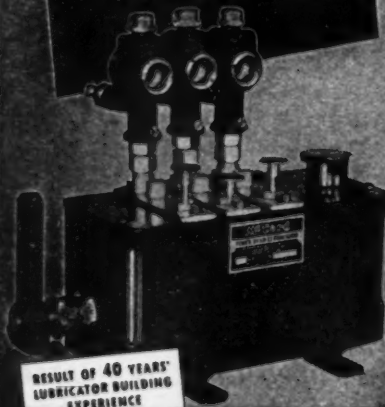
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NEW YORK 7, N. Y.

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LUBRICATORS**

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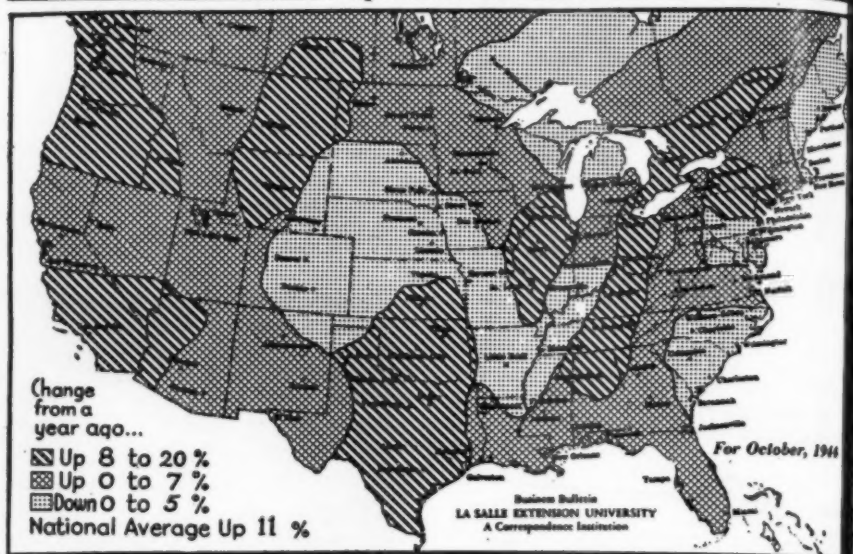


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**MCCORD**

RADIATOR & MFG. CO.  
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LUBRICATOR DIVISION

**LaSalle Map of Business Conditions**



**Fall Business 11 Per Cent Higher Than a Year Ago**

**Map Supplied by BUSINESS BULLETIN DIVISION of La Salle**

The rate of activity in both trade and industry remains high, although industrial production is slowly declining. The volume of trade is being held up at close to peak levels by the large amounts of consumer buying and increased activity in many of the service industries. A considerable part of this increase is due to the usual seasonal influences which tend to boost activity during the early fall months. Indications are that volume is going to remain high for sometime yet and possibly for the remainder of the year.

The general average of all business, including both production and trade, is about the same as it has been several weeks at close to 11 per cent higher than a year ago. Variations among different parts of the country are wide, with business below last year in some sections while in others it is around 30 per cent above. These spotty conditions can be expected not only while war production continues but also when industry is reconverting to peacetime operations.

Business is making the best showing outside the major industrial regions and in many places these differences are becoming greater. In both the upward and downward phases of business cycles, factory output usually changes ahead of changes in the other branches of economic activity. That trend is now taking place and it will probably become even more prominent in coming months. It affects not only different lines of business but also different parts of the country.

In the New England states and along the Atlantic coast business is lagging somewhat below the national average. The only major exception is the region around New York city where activity is showing considerable gains over a year ago. The

enormous shipments of war materials is one important factor in this excellent showing and these continue at a high rate until the end of European war. When fighting abroad stops reductions can be expected although volume remain high because of continued large shipments and also because of increased activity in industries.

Throughout the South business is about the same as the national average, although in the western section it is considerably greater. Other areas of above-average activity are the Middle West and the extreme northern and extreme southern of the Pacific Coast states. The expansion of industry in those regions is being kept up because air manufacturing and shipbuilding are still going at practically peak rates. The increasing demand for the war in the Pacific will keep production of that part of the country for an indefinite period.

An area of lagging business is the Mountain West and the territory to the east of the Rocky Mountains. In most of the farming districts, however, business is about the same as the national average, and livestock production are good and farm income is quite a little above last year.

The expansion of trade and industry in the West has been maintained at a little higher level in comparison with last year than it has in the other States. The volume of business is around 15 per cent higher than it was a year ago, but it is gradually levelling off. In some lines and in some regions it is gradually declining. Agricultural conditions are more favorable than they were a year ago, and crops will exceed those of last year. The trend is expected to continue favorable.



Application for Membership in the  
**Diesel Engineers International Assn.**  
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Name .....  
Address .....  
Reference .....

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MANUFACTURERS OF DIESEL ENGINES  
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## Fischer Resigns Lanova

JOHN FISCHER announces his resignation as President and Chief Engineer of Lanova Corporation. Mr. Fischer has been associated with Lanova for the last ten years and has been responsible for all technical development in connection with conversion of licensee's diesel engines to the Lanova combustion system, in addition to which he has developed and patented several new features in the Lanova system. Mr. Fischer has made known his intention to do consulting work on high-speed diesel combustion systems, working from his headquarters at 303 Lee Ave., Yonkers, New York.

## Synchro-Start Bulletin Promotes Diesel Sales

SYNCHRO-START Products Inc. has issued a four-page bulletin designed to show how its paper and direct mail advertising has paved the way to greater Diesel sales by showing how the use of automatic engine controls has broadened the field for the use of diesel engines. The bulletin carries reproductions of Synchro-Start advertisements which have appeared during the past year and besides showing what Synchro-Start Controls are and how they do it carries a list of media which have obviously been selected to help create a new Diesel market. A copy of the new Synchro-Start Controls bulletin will be mailed on request to Synchro-Start Products, Inc., 221 Fullerton Street, Chicago 16, Illinois.

## Space Saving Possibilities

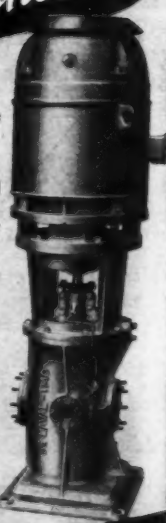
### The De Laval-IMO OIL PUMP

is exceedingly simple and compact.

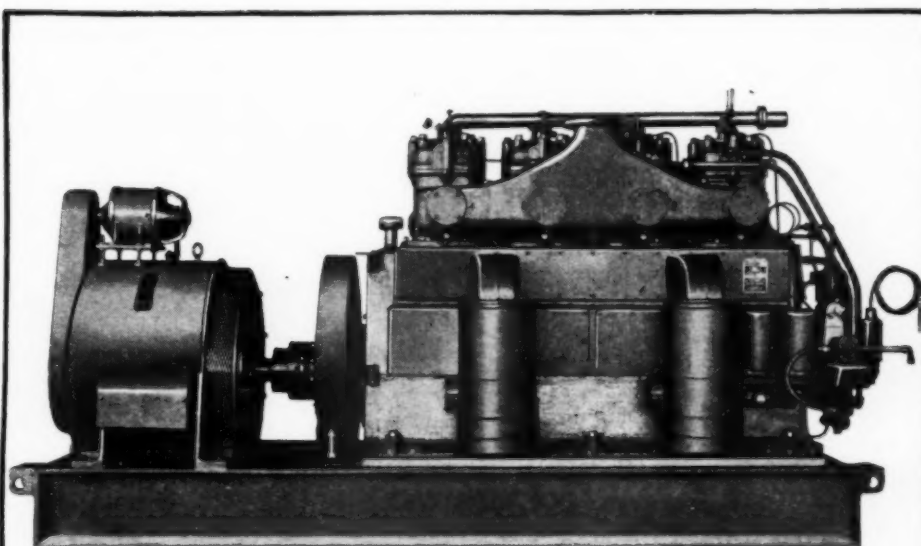
Because of absence of valves, gears and reciprocating parts it can be directly coupled to run at motor or turbine speeds. There is no vibration or pulsation.

It handles any oil against any pressure. Ask for Catalog I-95.

Like oil service pump; 300 g.p.m. of 120 SSU oil from 10 in. Hg. suction to 50 lbs. per sq. in. at 1150 r.p.m.



**IMO PUMP DIVISION**  
of the  
De Laval Steam Turbine Company  
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## DUPLEX DIESEL ELECTRIC GENERATING PLANT,

600 RPM, 60 K.W.

# Duplex Truck Co.

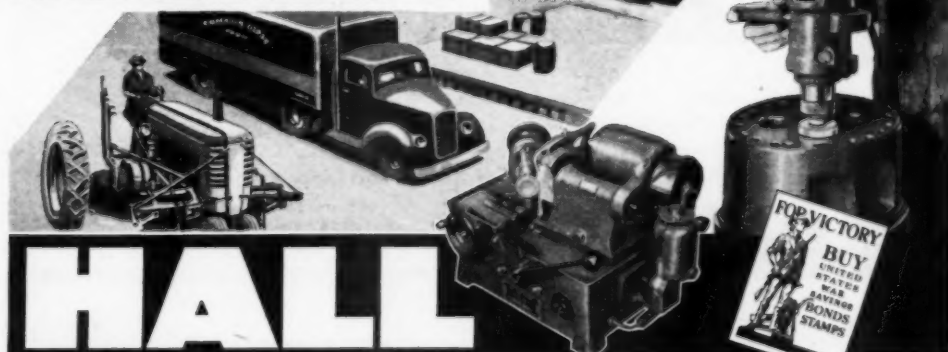
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**because** they not only deliver maximum fuel cost but can be kept operating at higher efficiency longer — thanks to HALL diesel type valve and valve seat servicing equipment.

Pictured at extreme right is the Model EDP ECCENTRIC type Valve Seat Grinder being used in a diesel valve cage to restore original factory precision and finish to the seats. Many diesel builders use large HALL multiple spindle Grinders in their production. The Model EDP service grinder exactly duplicates original factory grinding standards . . . To the left of the Seat Grinder is the HALL wet type diesel Valve Refacer with dual motors, rheostat control of grinding speed, micrometer feed and many other features. Complete information on request.

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**LESS SPACE....  
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*in this* **newest MOTOR-  
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It's a superb performer, too, because every feature of K and R built-in quality is included. Ideal for ships, factories, airports. Another example of our top place as engineers and designers.

Generator and motor armature are mounted on one common shaft, supported at each end by over-sized ball bearings. Installed in one integral frame.

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**KURZ & ROOT CO.**  
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INTERNATIONAL MOTOR GENERATOR SETS

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Guaranteed **HARD SURFACED**

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New York  
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Protect your investment,  
avoid costly shut-downs,  
with Penn Automatic Con-  
trols for Diesel engines.  
Write for Bulletin E100.

**PENN ELECTRIC SWITCH CO.**  
GOSHEN, IND.

### New Carbon Dioxide Fire Extinguisher Mobilizes Large- Area Fire Fighting

SINCE it's "Mr. Average Employee" who usually faces the fire—mobility and ease of operation are all-important in combating wide-spread flames with the heavy-duty fire extinguisher.



Randolph "25" Mobile Fire Extinguisher

Keeping these factors in mind, Randolph Laboratories, Inc. of Chicago, Illinois, has produced a 25 pound wheel-type carbon dioxide fire extinguisher that is moved and operated with uninterrupted, single-sweep action.

The Randolph "25" features an exclusive palm-trigger valve, mounted conveniently on the extinguisher steel handle. By grasping the handle, the operator can move the unit and press the release button with one hand—discharging a penetrating, icy blanket of carbon dioxide in a large, sweeping arc—10 to 20 feet.

**PETROMETER**  
FOR TANK GAUGING EQUIPMENT FOR  
DAY TANKS & CLEAN OIL STORAGE  
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#### Diesel Exhaust and Air Intake

Absorbs vibration. Can't leak or burn out. No need to loosen. No packing to rely on for tightness. In 1" to 36" I.D., inclusive. With forged steel flange nipples in lengths desired, straight or bent to your specifications. Atlantic Hose is widely used in Industries, Plants, on Railroads, in Marine service and by the United States Navy.



For complete information write for our Bulletin 10-B.

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YOUR FUEL  
SUPPLY  
AT A  
GLANCE**



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**GRADE NO. 1000**  
A special FINE valve grinding or finishing compound recommended by Mfrs. of users of diesel engines for "lapping in" "finishing" injector seats and injector valves. Trial can ..... \$1.00 prepaid.

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**WANTED**

Layout Engineers, Designers, Draftsmen, Preferably with design experience on gas or Diesel engines, compressors, etc., for actual drawing board work on layout and development of design on long range research projects for U. S. Navy. The Baldwin Locomotive Works, Eddystone, Pa. Statement of Availability from WMC required.

High Gaskets by F G

Gaskets of give reliable operating c

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THE FITZ

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Wheat: Chic Canadian

FITZ

SINCE 1906

NO

Used on Maritime Army Transport, Coast Guard, Boat Vessel.

The system is entirely automatic and does not require manual operation. In other words, no need for a push button.

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BROWN AUTOMOBILE FOR

FLECK 1703 EASTERN AV

America ELECT GEN TRAN from 1 H. 25-50-60 ELECTRIC ENGINE 63 CUREV GLENWOOD

DIESEL large selection—All motor engines, gas, turbo engines, turbo Complete A. O. SCHOONMAKER 10 Church Street Phone



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for 38 Years**

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Branches: Chicago, Illinois, Los Angeles, California  
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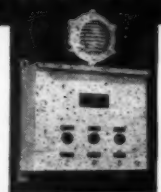
**FITZGERALD  
GASKETS**  
THE COMPLETE LINE THAT COMPLETELY SATISFIES

## NO NUISANCE SIGNALS

Used on Maritime Commission,  
Army Transportation Corps,  
Coast Guard, Bureau of Ships  
Vessels.

The system is entirely automatic  
and does not depend upon  
manual operation of switches.  
In other words, no running back  
and forth to push buttons on the  
panel.

Send for our Bulletin No. 10



**ABSOLUTE PROTECTION  
AGAINST LUBE OIL OR  
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**CROWN AUTOMATIC ALARM Systems  
FOR DIESEL ENGINES**

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**America's Best Assortment  
ELECTRIC MOTORS  
GENERATORS  
TRANSFORMERS**

from 1 H.P. to 1000 H.P. A.C.  
25-50-60 cycle D.C., all voltages  
**ELECTRIC EQUIPMENT COMPANY**  
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GLENWOOD 4783, P.O. BOX 51

### DIESEL ENGINES

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Phone—Worth 2-8485-6-7

Release of pressure on the palm-trigger automatically stops the flow of carbon dioxide gas—eliminates twisting of valves and retains the remainder of the charge for repeated attacks.

This simplified operation saves precious seconds and greatly reduces the chances of "operators panic." Additional information on carbon dioxide fire-fighting methods may be obtained from the manufacturer, Randolph Laboratories, 8 East Kinzie St., Chicago, Illinois.

### West Coast Diesel News

By **JIM MEDFORD**

**CONSTRUCTED** at Attalia, Washington, on the Upper Cumbis River, by the Tidewater Transportation Co., the 64-ft. all-welded steel river tug now nearing completion will have a pair of 150 hp. Cooper-Bessemer marine Diesels.

**COMPLETELY** rebuilt, the Ketchikan, Alaska, tug *Alaska IV* owned by Capt. F. E. Campbell has received her new 150 hp. Fairbanks-Morse marine Diesel at the Grandy Boat Yard.

**FOR** the British Columbia Packers, Mercer's at New Westminster, B. C. is constructing a combination packer-seiner of 75 feet and powered with a 200 hp. Fairbanks-Morse marine Diesel.

**AT** Newport Harbor, California, a new 61-ft. purse seiner is to be launched for Capt. E. Fisher of Monterey. Main engine is a 120 hp. Buda marine Diesel with Twin Disc gears and power takeoff and Coolidge wheel.

**A COMBINATION** whale-killer and tuna clipper building at East Bay yards, Oakland, California, for Richard DePolla will have a 250 Enterprise marine Diesel, Caterpillar marine Diesel auxiliaries, Maxim exhaust silencer and fresh water cooling.

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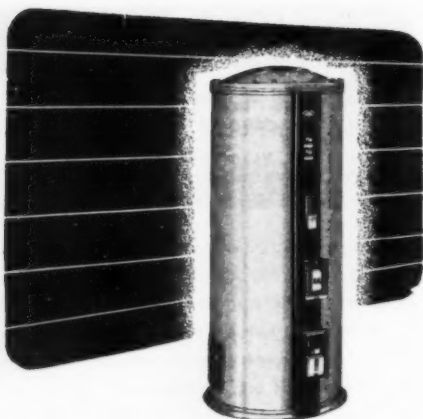
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### SEAMLEX COMPANY, Inc.

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THE 56-foot utility boat *Bonila Rock* of the Coast Construction Co., Vancouver, B. C., has been repowered with a 160 hp. Cummins marine Diesel by Tofino Machine Co.

ANOTHER Vancouver, B. C., Cummins marine Diesel installation is a 60 hp. unit in the fish packer *Lutak* by Charlie Eden for Danny Moore.

COLBERG of Stockton, California, have completed their third 80-ft. seiner, the *Paolina* for Joseph Torrento. The main engine is a 250 Atlas Imperial marine Diesel.

NUNES Bros., of Sausalito, California, have completed a 58-ft. hook-and-line boat for Angelo Costanzo. Capacity is 50 tons and main engine is a 135 hp. Caterpillar marine Diesel.

ON Humbolt Bay, Northern California, the Humbolt Bay Construction Co., is completing a 47-ft. dragger for Capt. O. Damato of San Francisco. Power is an 85 hp. Atlas marine Diesel.

POWERED with a 600 hp. Enterprise Diesel and having a pair of Caterpillar 115 hp. auxiliary Diesels; G. E. Motors and F-M pumps, the Birchfield Boiler Works, Tacoma, Washington, will construct a new clipper for Davies and Martinolich.

THE United Concrete Pipe Co.'s ship division of Long Beach, California, will construct a 215-ft. steel tunaman to be powered with 300 hp. Superior Diesel and having two Superior Diesels for auxiliaries.

NORTH CAPE, 70-foot dragger for Sig Kragness by the Tacoma Boat Building Co., Tacoma, Washington, will have a 6-cylinder, 120 hp. Atlas Imperial marine Diesel.

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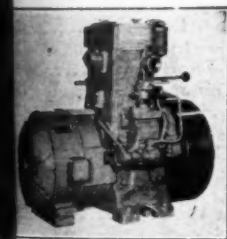


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Representatives in Principal Cities

**A** MURPHY marine Diesel of 135 hp. will power the Alioto and Torrente 58-ft. dragger under construction by Nunes Bros. yard on San Francisco Bay.

**F**OR repowering the 45-ft. tug *Victory* of San Francisco, Les Peterson has purchased from Oswald Bros., Murphy distributors, a 135 hp. Murphy marine Diesel. Another of same size and make goes into Nick Milosevich's 58-ft. purse seiner.

**A**ERICAN GIRL, 106 feet and powered with a 400 hp. Atlas Imperial marine Diesel and two Caterpillar auxiliary Diesels was launched by Western Boat Building Co., Tacoma, Washington, for Van Camp Sea Food Co. Pumps, motors are all Fairbanks-Morse.

**T**HE Mavar Brothers of San Pedro, California, have repowered their 42-ft. *Stell M* with a 60 hp. Atlas Imperial marine Diesel replacing a smaller Atlas of 14 years operation.

**W**ESTERN Boat Building Co., Tacoma, Washington, are pushing a 96-ft. tunaman for French Sardine Co., with 400 hp. Enterprise main Diesel and two Atlas Imperial Diesel 70 hp. auxiliaries.

**A**NOTHER San Francisco Bay fisher gets a Caterpillar Diesel—Angelo Pisani's 38-footer will install a 60 hp. engine with Twin Disc reduction gears.

**A**T Astoria, Oregon, the Columbia River Packers Association have constructed three power barges 72 ft. o.a., each with twin 85 hp. Cummins Marine Diesels and Twin Disc gears turning 30 x 18 in. wheels.



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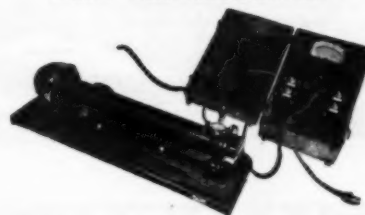
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